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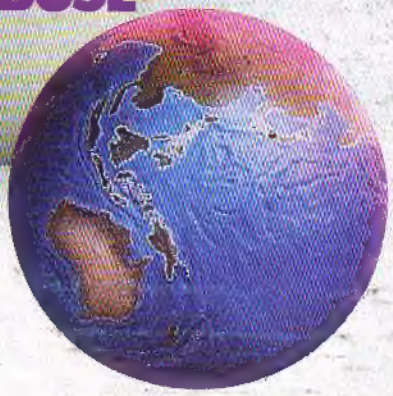
THE FIFTH FORCE: A NEW LOOK AT THE REALITIES OF ANTIGRAVITY

GRAND ILLUSIONS: WHEN SCIENCE AND MAGIC MERGE

ALICE MILLER: THE TROUBLE WITH FREUD, VIOLENCE, AND CHILD ABUSE



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VOL. 9 NO. 6 MARCH 1987

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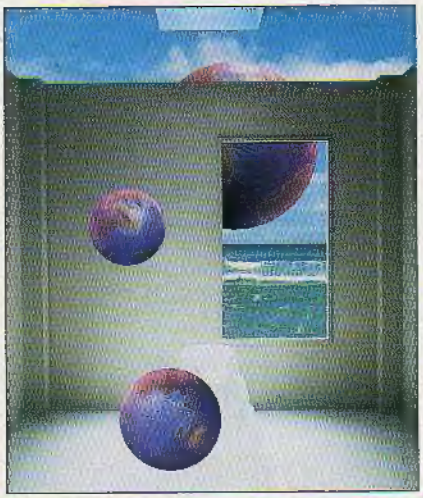

San Francisco-based commercial artist Larry Keenan creates conceptual and special-effects photography for advertising and corporate firms. In this "3-D" picture, the viewer feels as if he is floating among the objects, the Earths both inside and outside the room.

OMNI (ISSN 0149-8711) is published monthly in the United States and Canada by Omni Publications International Ltd., 1965 Broadway, New York, N.Y. 10023-5965. Second-class postage paid at New York, N.Y., and at additional mailing offices. POSTMASTER: Send address changes to Omni Magazine, Post Office Box 3039, Harlan, Iowa 51537. Volume 9, Number 6. Copyright © 1987 by Omni Publications International Ltd. All rights reserved. Tel. (212) 496-6100. OMNI is a registered trademark of Omni Publications International Ltd. Printed in the U.S.A. by Meredith/Burda Corp. and distributed in the U.S.A., Canada, U.S. territorial possessions, and the world (except the U.K.) by Curtis Circulation Company, 21 Henderson Drive, West Caldwell, N.J. 07006. Distributed in the U.K. by COMAG, Tavistock Road, West Drayton, London, UB7 7QE, England. Entire contents copyrighted. Nothing may be reproduced in whole or in part without written permission from the publisher. Any similarity between places or persons mentioned in the fiction or semifiction and real places or persons living or dead is coincidental. Subscriptions: U.S., AFO—$24 one year; Canada and elsewhere—$28 one year. Single copies $3.00 in U.S., AFO, and Canada. Telephone: 1-800-247-5470; in Iowa: 1-800-532-1272. The publisher disclaims all responsibility to return unsolicited matter, and all rights in portions published thereof remain the sole property of Omni Publications International Ltd. Letters sent to Omni or its editors become the property of the magazine.

FIRST WORD

By Hugh Downs

"It was as if we had decided to grow apples, worked long and hard to plant an orchard, brought in our first abundant crop, and said, 'Now let's chop down the trees for firewood.'"

Late last May, after a year of diligent labor, the National Commission on Space gave us a chance to change our timid, self-defeating ways. We can, its final report declared, loft a manned space station in the early Nineties, return to the moon by the year 2005, and place a research base on Mars by 2015. And all these outposts can be linked by an inexpensive shuttle system that will permanently establish humanity as a spacefaring species.

It is an exciting plan, and it deserves warm support, both from the government that requested it and from the American people. Instead, it seems destined for the genteel oblivion we reserve for commission reports and former vice presidents.

To see the future we are now building by default, we need only look to the past. Toward the end of his life, Wernher von Braun examined what remained of the space program after our retreat from the moon. It was, he told me, as if we had decided to grow apples, worked long and hard to plant an orchard, brought in our first abundant crop, and then said, "Well, we did it. Now let's chop down the trees for firewood." A year after our last moon landing, there was little left of our manned space program but the dying echoes of self-congratulation.

Since then money, more than wisdom, has ruled NASA's efforts. In building the space shuttle, NASA was forced to cut its annual budget by stretching development over needless years; that added several hundred million dollars to the shuttle's cost. The boosters that destroyed the *Challenger* were chosen not because they were the best available—engineers considered them the least reliable of the four designs submitted—but because they were the cheapest.

By all evidence, these priorities still prevail. NASA's budget for basic research, long pegged at less than one fourth its Apollo-years peak, shows no sign of recovery. The only major project on NASA's drawing boards is the space station. Once intended as a major advance over any orbital facility yet built, budgets reportedly have pared the current plan to something resembling the Soviet *Mir* sent aloft last year.

If the United States is ever again to lead in space under the policies it has followed these last 15 years, success will come as Apollo did—as a frenzied response to the triumphs of others. We may have that chance when the Soviet Union lands men on Mars, a plan that was established before Apollo reached the moon and that is still on schedule. But as we have seen, success without commitment is easily lost.

But what of success with commitment? The past also teaches what can be accomplished by a government dedicated to the future. Until 1918 mail still crossed this continent at about the pace of the pony express. Airplanes were the frail, dangerous toys of barnstormers. They could never be anything more because no one could justify paying the cost of developing more capable craft.

Yet in 1973 I heard about a woman who in her nineties had returned from San Diego to visit her birthplace in Independence, Missouri. She had made the journey west in a wagon train that took half a year to reach its destination; she flew back in four hours. She could make that flight because in 1918 the federal government had the wisdom to sponsor airmail, a market that could support the creation of fast, reliable airplanes capable of carrying large payloads. When World War II demanded even more sophisticated aircraft, the basic technologies had already been developed.

Officials in 1918 could not have imagined that thanks to their efforts, some 25 million people per year now cross the Atlantic by air or that cargo planes today carry everything from canceled checks to fresh fish. They supported aviation out of the faith that a powerful new technology would someday prove useful.

Similarly, there should be little need to make a case for the earthly value of the space program. Space itself will eventually prove the wisdom of going there. But even for those immune to history, the space program has already proved its worth. Not just Tang and Velcro but the entire computer industry as we know it, much of today's medical technology, and uncountable lesser benefits have been developed from it. Chase Econometrics once calculated that each dollar spent on space had returned four dollars to our national economy in the form of new products and new jobs.

In fostering our national prestige, Apollo was even more successful. The United States led the free world not because it had more atomic weapons than the Soviet Union or because it had such allies as the Shah of Iran. It led because it had won the respect of people the world over.

As a great power, the United States has often felt compelled to intercede in the affairs of other nations. We have moved militarily to restore democracy to Grenada; we tried to bring peace to Lebanon; and we now feel it necessary to drive the Sandinistas from power in Nicaragua. More often than not, we have succeeded only in proving that we cannot run the world—either single-handedly or in cooperation with allies.

Yet we can still provide the leadership that the world sorely needs. To be effective it must be leadership by example, by the accomplishment of great deeds for the betterment of mankind. A renewed space program is a key part of that leadership. The report of the National Commission on Space is the place to begin.

Hugh Downs, host of ABC TV's 20/20, is one of America's leading space advocates.

CONTRIBUTORS

OMNIBUS

BARKER

MAY THE FORCE BE WITH YOU

GRAND ILLUSIONS

BEYOND THE CHALLENGER ERA

CONNORS

Having read Alice Miller's *Thou Shalt Not Be Aware*, a book about child abuse, one *Omni* staff member recently recalled incidents from his own childhood. His stepfather, he says, had been a prison guard who never seemed to be off-duty. At home he treated the oldest son as if he were a convict, verbally humiliating him in front of the family, until the boy thought of himself as a criminal. With no sense of self-esteem, he grew up expecting to be ridiculed for every endeavor.

"Such personal responses to Miller's work don't surprise me," says psychotherapist *Diane Connors*, who conducted this month's Interview with the Swiss psychoanalyst (page 72). "Everyone has a history, and her readers seem to identify with her work." As Miller points out, we're all made to feel responsible for anything shameful that happens to us. But she believes the root of violence lies in the trauma of childhood and that the trauma is reenacted repeatedly. "Since discovering her work, I've used her theories in my own practice," Connors says. "In order for the patient to make progress in therapy, the analyst must be supportive and let the child reemerge."

Miller notes that her theories took shape after she began releasing spontaneous creativity in her paintings; it was then that she became reacquainted with the child in herself. Yet, interestingly, she will not talk about her own childhood.

Bruce Schechter, who wrote "May the Force Be With You" (page 36), definitely believes there's a child inside him—"and sometimes not so much inside," he adds. Schechter, who has a doctorate in theoretical particle physics, now reports on Purdue University physicist Ephraim Fischbach's theory of a force of nature that may counteract gravity. If Fischbach is correct, it could lead to a unified theory of the universe, something physicists have eagerly been seeking ever since Albert Einstein developed his theory of relativity.

"I always try to bring myself back to the uncritical state of childlike wonder," Fischbach says. "We're all burdened with learned prejudices, but I try to undo what I've learned in order to recapture that special spirit of fascination."

In the art of magic, of course, conjurers remind us that there are still things in the world beyond our understanding. In the past, magical tricks using scientific developments inspired inventors like Alexander Graham Bell. In the twenty-first century, however, magicians may not be able to compete with technology, according to magician *Ricky Jay*, author of *Learned Pigs and Fireproof Women* (Villard Books). For "Grand Illusions" (page 44) Jay spoke to such beguiling performers as Doug Henning, David Copperfield, and Penn and Teller. Their opinions vary, of course, but whatever direction future magic takes, it will still appeal to our childlike sense of wonder.

"A child looks at the world with a sense of wonder and curiosity, without any preconceptions," *Richard Wolkomir* says. "And that childlike quality aids the writer in the initial approach to a story." For "Beyond the Challenger Era" (page 62), Wolkomir focused his curiosity on current and former astronauts and their opinions of the space program and its management. Following the investigations into the *Challenger* accident last year, the spacefarers have demanded to be heard. And after years of neglecting its astronauts, NASA is listening and making changes based on their recommendations. Despite the 1986 tragedy and later disclosures of flight mismanagement, Wolkomir notes, the allure of flying in space still has a powerful hold over everyone.

English author *Clive Barker*, likewise, has a powerful hold over his readers. "What he does makes the rest of us look like we've been asleep for the last ten years," Stephen King has said. "He's an original." What makes him—and his stories—intriguing is the way he takes ordinary people and horrifyingly exposes their animal urges. "The urge for polymorphous perversity, for pleasure, for the satisfaction of appetite, for fascination and curiosity, are what motivate me and my fiction," Barker says. "And I don't care to cover my feelings. I want to articulate them and speak directly." *Babel's Children* (page 48)—an atypical Barker story, with no blood and guts but possessing great charm—is from his collection *In the Flesh* (Poseidon Press).

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MARCH

LETTERS

COMMUNICATIONS

Rock and Roll Fantasy
I'm pleased with Lorraine Prinsky's survey on rock and roll ["Sex, Violence, and Rock and Roll," Continuum, December 1986]. The truth is told, finally, by qualified sociologists and not fanatical ministers: Listening to the lyrics of a song does not make me want to act them out.

If I read a newspaper article about rape, I don't want to go out and rape someone. And if I hear a song about how great heroin is, I don't want to buy the stuff. Providing labels on albums that contain "explicit" material will limit the creativity of talented artists. After all, drugs, sex, and violence happen every day.

Richard White
Pomona, CA

The Miracle Worker
The "miraculous" recovery of sight in the cortically blind patient "Eliza" cited by Jim McConnell is not without precedent; nor are the generic methods used to retrain Eliza in visual perception; nor, for that matter, is the basic thesis of neuronal reorganization ["Darkness Visible," Mind, December 1986]. All of those precepts were enumerated 20 years ago by two gentlemen often scoffed at by the medical profession, Doman and Delicato. They have treated some 40- to 50-odd cortically blind children, with sight being restored in roughly one quarter.

I hope that Drs. Kewman and Merrill continue their efforts on the fringe of medical science and more important, that they publicize their findings in the appropriate medical forum. We parents of similarly brain-injured children have gained precious little from the traditional medical approach, and it is heartening to find someone challenging the traditional viewpoint of hopelessness.

T. J. Bunt, M.D.
University of South Carolina
School of Medicine
Columbia

Animal Talk
I must applaud you on your interspecies communication experiment ["Calls of the Wild," December 1986]. For some time now, a number of individuals have been working with animals, but their work has been either ignored by the public or treated with condescension: "Who cares?" or "Isn't that cute?"

A good two-minute howl with a wolf is refreshing enough to relieve eight hours of stress from the job. Maybe the types of "participation experiments" you reported on will open our minds to the possibility of communicating with other species.

Mark Lyon
Middlebury, CT

I was very disappointed with your article "Calls of the Wild" as a representation of what is going on in interspecies communication today. I have worked under the supervision of Francine Patterson, president of The Gorilla Foundation, and with Koko the gorilla for six years. I'm amazed that you didn't mention Patterson's work with Koko—the longest continuous study of language acquisition in a nonhuman primate. I am astounded by Sue Savage-Rumbaugh's statement that understanding English was something "apes just could not do." Koko has shown exceptional comprehension of spoken English since her babyhood, and this has been carefully documented. Koko even eavesdrops. When Michael, Koko's male gorilla companion, told a worker in the next trailer about a hurt finger, Koko instantly kissed her own finger. Koko even signs to herself.

Joanne Tanner
The Gorilla Foundation
Woodside, CA

Corrections
In the description of the January cover, photographer Steve Sint's name was misspelled. Our apologies.

In the December interview with Linus Pauling, Pauling was quoted as saying that Bronson Pharmaceuticals sells ascorbic acid, in fine crystals, at $15 a half kilogram. It is sold for $15.50 per kilogram.

Also, the two creators of Superman ["Never Ending Battle," Continuum, December 1986] are Jerry Siegel and Joe Shuster.

THIS BRAIN'S FOR HIRE

FORUM

Omni welcomes speculation, theories, commentary, dissent, and questions from readers in this open forum. We invite you to use this column to voice your hopes about the future and to contribute to the kind of informal dialogue that provokes thought and generates breakthroughs. Please note that we cannot return submissions and that the opinions expressed here are not necessarily those of the magazine.

Today we chuckle at the nineteenth-century system of phrenology, with its attempts to diagnose personal traits and qualities by individual patterns of cranial bumps and depressions. What's less well-known, however, is that phrenology was begun by Franz Gall as a serious study of cerebral localization—and his legacy endures in modern research: Brain structure does affect brain function. Yet it's those caricatured novelty-store "brain charts" that most people tend to conjure up when they think about the brain's functions.

And it may be these very same cartoon versions of modern neuropsychology for which the present era will be remembered, due largely to the efforts of commercial popularizers who now hawk "brain training" books, tapes, courses, and seminars the way Dianetics and est were promoted in their time.

Actually, this phenomenon stems from two seemingly unrelated developments in the last decade or so. One is the growth of interest in brain research itself, particularly in the roles of the two cerebral hemispheres in thought and behavior. The other is the exponential yuppification of just about everything. Virtually every new idea is pressed into service for quick-fix financial applications.

Consider a recent popular book called *Whole Brain Thinking*. Sounds innocent enough, even a bit yin-yangy, until you get to the subtitle, which lays down the bottom line: "Working from Both Sides of the Brain to Achieve Peak Job Performance." No mush-minded, alpha-helmet types need apply. This volume—which the blurb tells us is based on a seminar given by the authors—is full of suggestions: for determining whether your company is left or right brained; for neuropsyching-out your coemployees with a Brain Preference Indicator; and for employing various brain "exercises" to achieve optimum hemispheric integration, thus maximizing executive efficiency and worker productivity.

Or how about a managerial training course that, not satisfied with a simple left–right metaphor of brain functioning, lets the participant determine his or her own "dominance profile," which is then plotted—sort of like an astrological projection chart—on a multicoordinate graph? Instead of sun, moon, and rising signs, however, we get a personality profile in terms of left mode versus right mode and cerebral versus limbic. A cerebral–left type would be skilled at logical thinking, analyzing facts, and numerical processing. A limbic–right type capitalizes on gut reactions and interpersonal influences.

Yet another system goes so far as to combine the triune brain concept of pioneering brain scientist Paul MacClean with the cerebral-lateralization model of brain researcher Roger Sperry and neurosurgeon Joseph Bogen *and* (for good measure) a frontal–posterior dimension. This yields the Penta-Brain, a "whole-brain model of the human biocomputer." Now you can identify not only your limbic system and your left and right hemispheres but your mammalian and reptilian psychoselves as well. But it takes some ingenuity to turn all this into a practical system of business management.

The problem, of course, is not whether any of these schemes and manipulations actually work. Deciding whether a business merger or a problem in employee relations calls for an analytic or a global strategy may, in fact, be a very good first move. It's just that the use of brain metaphors to back up these ideas has essentially nothing to do with their effectiveness. At best, neuropsychology is irrelevant, because we're only beginning to understand the cerebral bases of the brain's complex processes. Certainly we're nowhere near being able to prescribe methods to change cerebral dominance. Besides, if it works, it works whether or not you invoke the brain as an explanatory metaphor. At worst, neuropsychology becomes trivial nonsense. For instance, do you really believe that the reason for the postwar economic success of the Japanese is that they use a more "right-brained" business approach than American executives do? Has anyone studied Lee Iacocca's limbic system lately?

So why not just train people to be better at what they want to do and leave the brain out of it for now? Because the brain is very hot coin, that's why. When you've got something to sell, peg it to what people are buying. And as long as brain-tagged products and services appeal to the upscale managerial market, we're going to see more of the same.

Not that this is all a bad thing. Just as fad diets can sometimes lead to knowledgeable health practices, as consumer sophistication in the brain biz grows, people will be challenged to learn more about how—and why—their brains actually work the way they do.

The downside, however, has to do with another aspect of the phrenology story. Gall, remember, was a serious brain researcher who believed that subtle differences could be traced to different brain regions. Today we know better—a little better, anyway. Gall, however, at least made the study of brain structure and function respectable. But all that was almost undone by an errant disciple, Johann Spurzheim, who believed in making the most of a good thing while it lasted. Spurzheim traveled the world touting phrenology as a self-improvement system for strengthening the "moral and intellectual organs" of the brain by proper training. Sound familiar?

The morals: 1) Everything old is new again; 2) as in the world of diet pills and no money down, caveat emptor applies to the brain consumer as well.

Laurence Miller
Professor of Neuropsychology
Seton Hall University
South Orange, New Jersey

WORLDLY HEALERS

EARTH

By Carole Douglis

Buzz saws will topple the last of the great tropical forests by 2087. Along with the trees will vanish a million or more other species. Plants and creatures that might have helped cure cancer, halt AIDS, and produce petroleum substitutes, insecticides, new fibers, and foods will be gone. Such rampant destruction of life forms will snap subtle links in the earth's great web of life, the web that helps produce the very air we breathe and the climate in which we live.

No longer will the majestic forests take in carbon dioxide in their foliage. Massive quantities of carbon dioxide—emitted by coal, oil, and trees as they burn—will produce a greenhouse effect gone wild. This atmospheric aberration will warm the earth and lead to climatic changes that may contribute to worldwide flooding and famine early in the twenty-first century.

We seem headed toward an environmental nightmare. Yet, undaunted by the gloomy headlines, researchers around the country are adapting the best of recent technological know-how to heal the earth's wounds. A new corps of environmental visionaries is at work, gaining support from sources ranging from nonprofit organizations to venture-capital firms. They span the sciences—from zoology to microbiology, ecology to bioengineering—applying technology to such diverse aims as saving endangered animal species, revitalizing desolate lands, and detoxifying polluted water.

Betsy Dresser, a Ph.D. in reproductive animal physiology and director of research at the Cincinnati Wildlife Research Federation, is equally at home shooting hormones into a wild rhino with a blowpipe or lecturing on animal reproduction. Dresser's mission is, simply put, to preserve life on Earth. In her quest she is perfecting brave-new-world techniques of reproduction to help endangered animals multiply. These techniques include freezing sperm and embryos, producing test-tube babies, cloning, and embryo transfer. High-tech births are now commonplace in the livestock industry, but applying such techniques to wild animals is an idea new to science.

Someday, frozen zoos will be thawed to reinhabit the jungles and savannas of the earth.

Dubbed "Dr. Noah," Dresser hopes to save many thousands of animal embryos, frozen in suspended animation, in an "ark" that will weather centuries. "It's still a major event to produce one or two offspring of exotic animals by these methods," says Dresser. "We have to learn a lot about the reproductive physiology of each species. Just figuring out what the estrous cycle is and what hormones will influence it can be a big job."

Displaying her toothy grin and quick laugh, Dresser talks about "Mom." This mom, though, is a gray Cincinnati house cat and surrogate mother: Her four fuzzy kittens are the first in the world to be created from frozen embryos.

"Working on Mom helped us develop nonsurgical embryo-transfer and embryo-freezing techniques in cats," Dresser says. "Soon we hope to use domestic cats as surrogate mothers for endangered wildcats." Dresser plans to flush embryos from the endangered Indian desert cat and the rare African jungle cat and transplant them into domestic cats. Embryo transfer can increase the population of a dying species far faster than ordinary mating would.

Dresser hopes to also enlist lions to incubate rare tigers, white rhinos to bear endangered black rhinos, and hard-to-mate gorillas to deliver their own test-tube babies. Already she has successfully used an eland—a common antelope—as a surrogate mother for an endangered bongo antelope, and recently Dresser traveled to Kenya and exchanged embryos between American zoo bongos and wild African populations, again using eland as surrogates to help boost the bongos' numbers.

There is an urgency to Dresser's tone as she says, "The public doesn't realize how fast we're losing wildlife to destruction of habitat." With "frozen zoos"—tanks of frozen embryos and sperm—though, we can hold in one room the genetic material of all the zoos in the world.

John Todd is as dedicated to restoring habitats as Dresser is to preserving animal life. A self-proclaimed "biological explorer," Todd was trained in agriculture

CONTINUED ON PAGE 84

THE EXODUS INSTITUTE

SPACE

By Edward Regis, Jr.

At first glance the structure looks like just another office building in Rocky Hill, New Jersey, a small residential community a few miles north of Princeton. Once a rocket-engine factory, the single story structure has wraparound windows that look out on a parking lot. No one would guess its occupants spend their days plotting the migration of humankind into space.

But inside the Space Studies Institute (SSI) the decor is decidedly futuristic, from ultramodern furniture to wall art of orbiting space cities and lunar colonies.

The people here are not idle dreamers. Their goal is to show that money can be made in space, a feat that they hope will encourage people to leave the earth in the same way prospectors emigrated to California during the gold rush days.

And the people at SSI are in a hurry. They want to see space migration take place during their lifetimes. Today SSI is quietly establishing itself as a clearing-house for information on commercializing space, as a catalyst for biannual symposia on space manufacturing, and as a research institution in its own right. "Our mission is to do practical, nuts-and-bolts research," explains SSI vice president Gregg Maryniak. He hopes this research will bring space commercialization into full bloom on the moon.

"The moon is full of the resources that you need for building space stations, solar-powered satellites, and space habitats," Maryniak says. "What you need up there first are tools that will allow you to utilize those resources."

Unlike some space-advocacy organizations, which focus their energies and finances on lobbying and politicking, the institute concentrates on science. It keeps administrative and public relations costs to a minimum, spending the bulk of its $300,000 annual income from membership fees and donations for underwriting studies and research projects. To date, the most promising project has been an ingenious electronic cannon called a mass driver.

One of the biggest obstacles to developing space has always been the expense of getting materials up there. It costs thousands of dollars per pound to send material into space on the tip of a rocket or in the cargo bay of a shuttle. Wouldn't it be nice, thought SSI founder and Princeton University physicist Gerard K. O'Neill, if you could do away with the launch vehicle and just shoot things into space?

The SSI mass driver is a prototype of the cannon that may do just that, once we settle the moon. A simple device, it has two parts: one stationary, one moving. The stationary part features a series of electric coils put together in the shape of a gun barrel; the moving part is a reusable payload-carrying "bucket," a disc that is accelerated through the coils by a wave of electromagnetic force. The electric pulse from each coil accelerates the bucket until both the pulse and the bucket are blasting along at a blinding speed.

The model Mass Driver III at SSI can send the bucket zooming through the coils at 300 miles an hour. A mass driver set up on the moon's surface would be much larger—about half a football field long—and many times faster. It would hurl materials mined from the moon at the rate of 5,300 miles per hour. A mass catcher in stationary orbit around the moon would collect the ore. A funnel measuring some 200 feet across, the catcher would snag the flying packets of ore and feed them into a processing plant. In would go the ore, and out would come whatever you wanted: beams, spars, girders for space stations, maybe the parts for another mass driver.

The mass driver is only one example of the manufacturing technologies SSI researchers are working on. Standing in the parking lot is an ordinary-looking flagpole. Visitors to the institute are sometimes shown the flagpole because it is made of a fiberglasslike composite fashioned from the kind of glass that is readily available in the moon's rocks and soil. "People used to think of making space structures out of metals," Maryniak says. "But now we're thinking in terms of glass composites. Aluminum beams would warp because of the temperature differentials on the moon. Beams of

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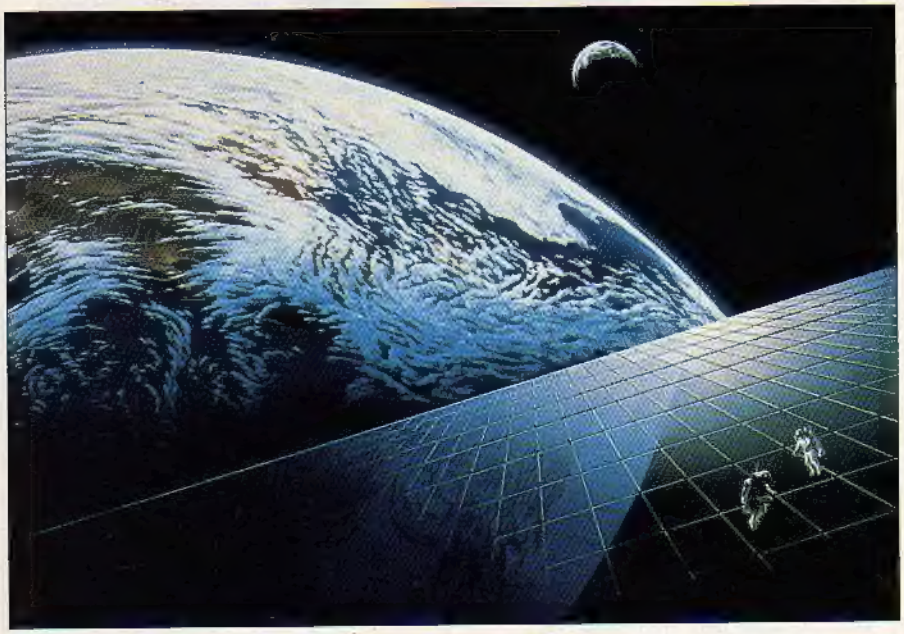

Solar-power satellite: Once space projects like this one begin, space colonies will follow.

IN SEARCH OF CAMELOT

BOOKS

By A.J.S. Rayl

In 1922 five-year-old Norma Lorre Goodrich received a gift—a copy of Alfred, Lord Tennyson's *The Idylls of the King*. It was the child's first book—and her introduction to King Arthur, the once and future king who ruled over a near-utopian empire called Camelot.

Despite most scholars' having shuffled Arthur into the world of mythology, Goodrich never doubted his existence. And her conviction eventually led to *King Arthur* (Franklin Watts), her fourteenth academic work and another best seller. "It's the first historical proof that Arthur lived," says Goodrich, professor emeritus of French and comparative literature at the Claremont Colleges in Claremont, California. "And the key that unlocked the doors was etymology."

Behind those doors, she discovered the real Arthur lived during the Dark Ages, not the Age of Chivalry; as a Christian, not a pagan; in a Camelot located in Scotland, not the south of England; and there he won his 12 battles as a seaman, not as a cavalryman.

Goodrich launched her Dark Ages dragnet in 1968. She read, reviewed, translated, and sometimes *re*translated ancient manuscripts. Sorting out the stories that seemed to be based—at least in part—on fact, she stripped away the mythology to get to the real world. With a manuscript like the twelfth-century *History of the Kings of Britain*, she had to correct the author's misreadings and misspellings. She extracted further clues from linguistics, literature, geography, archaeology, and anthropology.

Then, on Christmas eve, 1978, Goodrich settled down to review a thirteenth-century Old French manuscript. Titled *Sone de Nansai*, it told the tale of a man who conquered Ireland and was crowned at the Grail Castle. Reading it was not difficult for Goodrich, who has a double doctorate in French and Romance philology from Columbia University.

Midway through *Sone*, Goodrich came across something that made her shiver: a description of the Grail Castle with at least 12 specific directions. "It was the religious and educational center of Arthur's kingdom, but its identity had been one of the world's most closely guarded secrets," she says. "Nobody ever had directions to the castle. Even in Arthur's day, you could find it only by accident. But nevertheless, there it was, right in front of me."

Goodrich was convinced that proof of Arthur's existence lay in such manuscripts. "The earliest versions of the Arthurian story are not fiction at all," she says. "There is just too much precision in geography, history, politics, and customs." Every summer she traveled to Great Britain with her husband, whose knowledge of armies, battles, ships, and harbors proved invaluable. Together they spent hours in museums, drove down old roads, and followed overgrown paths. With the aid of ancient maps, they surveyed historic sites and sought out ancient monuments.

Such fieldwork allowed Goodrich not only to decipher locations according to existing landmarks but also to determine when a particular location was the same despite its having many different names in at least a half dozen different languages.

This was how she determined that Arthur probably had *two* principal Camelots, one of which was Scotland's Stirling Castle, the primary mustering spot for British forces through the years. The other was near the modern city of Carlisle in northwestern England. Camelot, it seems, was wherever Arthur was residing at the moment, his identifying pennant, with its clawed hammer, raised above the highest tower. Indeed, in the Celtic language, Goodrich says, Camelot means "Fort of the Hammer," and Arthur was often referred to as "the Hammer."

Goodrich also discovered the real Round Table. "And it wasn't a table at all," she says. The first mention of the Round Table, in Robert Wace's adaptation of *History of the Kings of Britain*, reads, "Fist Artus la roönde table," and translates as *Arthur made (or built) a tabled rotunda*. "In Old French the adjective follows the noun, so the noun in this case is *roönde*, not *table*," Goodrich says. Inaccurate translations had reversed the words and corrupted the meaning.

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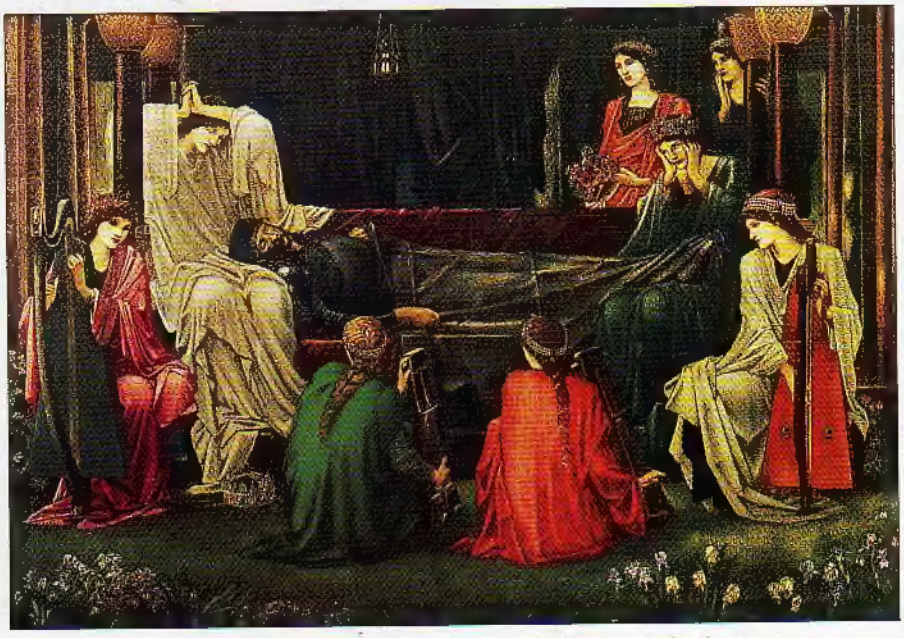
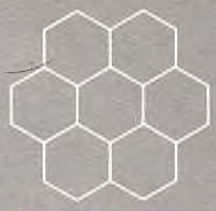


Fact or fiction? New research offers the first historical proof of King Arthur's existence.



CONTINUUM

THE TRUTH ABOUT BLACK BEAUTY

Halvor N. Christensen has met the enemy, and it is Bambi. Also Black Beauty, Babar, Peter Rabbit, and other fairy/fantasy tales of beasts that give children an overly sentimental view of the animal kingdom. Indeed, this emeritus professor of biological chemistry at the University of Michigan Medical School in Ann Arbor would have us believe that cute little kittens, talking ducks, and intelligent, introspective horses are waging an insidious antiscience campaign in our very living rooms.

Some children's literature, Christensen warns in an article he wrote for *Perspectives in Biology and Medicine*, "presents a biology so sentimental and unreal . . . that the reading or listening child is in danger of developing an antirational bias that could handicap him or her throughout school and life, even to the point of allowing recruitment for antiscience crusades." In other words, animal-rights activists who besiege scientific laboratories probably got their ideas about monkeys from Curious George.

"Perceptions of animals acquired in childhood—to a considerable degree, I believe, from stories," Christensen writes, "may derail the forward progress of medical research. For how is a scientist to uphold his Nuremberg Code obligation to test new therapeutic procedures in animals before applying them to persons when characters like Bambi have clouded the differences between animals and persons?"

"*Bambi* may do a lot of harm," Christensen said in a telephone interview. And the Walt Disney film version of it magnifies the faults of its thoroughly unreal biology. "In the story itself," Christensen notes, "the very leaves on the trees speak their philosophic doubts about the meaning of their fall. If such anthropomorphisms were fair play, one might be justified in constructing a story about a dog that grieves because his life must be uselessly sacrificed at the pound rather than usefully in the laboratory."

Christensen is a dedicated researcher who took his recent, published stand against children's stories after writing some 235 scientific papers over the course of his nearly 50-year career. As a member of the Midwest section of the American Academy of Arts and Sciences, Christensen was horrified by the attitudes he encountered against animal research. He believes children's stories are at least partially responsible, and he calls for constant vigilance on the part of parents, grandparents, teachers, and authors to counteract the rise of offending stories. He's a grandfather himself, one who writes long letters to his grandsons, complete with pictures illustrating his love of nature. He now takes exquisite care in selecting books for their Christmas and birthday presents and rues the day he introduced his own children to Dr. Dolittle and Freddy the Pig. "My children enjoyed them so," he recalls. "But in retrospect they're not pertinent to my cause. They neglect the questions I don't like to see neglected: What are animals like? How much are they like or unlike us?"

Authors are lured, Christensen thinks, by the "easy money" in children's animal stories. If they insist on writing animal stories, he feels they should follow three rules:

First, strive for "biological honesty." Everybody should take a page from E. B. White's book—the one called *Charlotte's Web*, which chronicles the exploits of a pig named Wilbur and the efforts of a spider, Charlotte, to save him from his fate of bacon and pork chops. What Christensen loves about this book is that it is "true to some of the harder facts of nature," especially Charlotte's bloodthirsty propensity for flies. Once Charlotte has narrated her natural history, including the scientific names for the seven segments of her hairy legs, Christensen can overlook her other, less biologically honest traits. To wit, Charlotte easily outwits the foolish humans around her by writing a few choice words (SOME PIG, TERRIFIC, RADIANT, HUMBLE) in her web.

Second, avoid gabby animals. Or as Christensen puts it, "If an animal must talk, the author might seek to adjust what is said to a level plausible for its understanding of its current experience." Probably the worst example in all children's literature was set by Black Beauty, who prattled on for several hundred pages in his well-known autobiography, expressing complex moral doubts.

Third, "signal the presence of fantasy" by mixing a few toy characters in with the animals. "We may recall that Hans Christian Andersen, along with other writers of children's stories, imbued not only animals, however sentimentally represented, but also toys, such as a tin soldier, with personalities in ways that perhaps guided the child against taking too seriously the attributes temporarily bestowed on an animal in the same story."

Wouldn't we hold A. A. Milne in lower regard today, given this argument, if Winnie the Pooh had been a koala instead of a teddy?—*DAVA SOBEL*

CONTINUUM

Why do people smoke? According to one psychologist, nicotine supplies a particularly effective coping response, providing smokers with improved alertness, memory, and overall performance

NICOTINE RESPONSE

One explanation for the stubborn refusal of so many habitual smokers to give up the habit may lie in nicotine's peculiar ability to provide an effective "coping response" as the behavioral psychologists call it to the demands of daily living.

One such psychologist is Orvide F. Pomerleau, who teaches at the University of Michigan School of Medicine and directs its behavioral medicine program. He has spent 13 years in lab work and treatment of nicotine addicts, studying the effects of the drug on the human mind. Pomerleau has come to the conclusion that the motives for smoking may be improvement in response, alertness, memory, and overall performance. He says smokers follow a pattern of arousal when they smoke, followed by a calming, tension-reducing state.

Some smokers can actually adjust their nicotine intake to enhance those effects selectively, which also adds to the allure of the cigarette. "They tailor their levels of smoking to the situation, although I don't think that they do it consciously," he says. Conversely, the absence of nicotine for the habitual smoker who decides to give up cigarettes leads inevitably to "a difficulty in concentrating, anxiety, memory troubles, and a craving for nicotine that varies in intensity from smoker to smoker. That's one reason why so many people go back to smoking."

—George Nobbe

FISH TALK

Arthur Myrberg spent 15 years listening to four-inch-long damselfish talk. Now he has learned how to talk back by chirping at them in what passes for their own language, a series of popping noises, grunts, and chirps of varying length.

Myrberg, a marine biology professor at the University of Miami's Rosenstiel School of Marine and Atmospheric Science in Virginia Key, Florida, says he can even control some of the damselfish's behavior under laboratory conditions, a feat made all the more difficult because many fish simply clam up in lab tanks.

Of his work, Myrberg says, "What this suggests is that one day we may be able to understand, predict, and perhaps even control the behavior of more useful or commercially valuable species, not just for human use but also for the species' own good."

So far, Myrberg has learned the language only of the damselfish, though he plans additional work with other talkative species. The practical possibilities are endless, ranging from summoning them to waiting fishermen to warning them of environmental danger, even to masking the sounds of submarine military operations.

The talkative damselfish. A series of pops, grunts, and chirps

The damsel fish's vocabulary includes a popping sound which establishes territorial claims, a short chirp, which is the male's mating call, a grunt, meaning it's time to spawn, at least as far as the male is concerned, and a longer, almost plaintive chirp which is the cry of the rejected male spurned by a female that won't enter his nest.

George Nobbe

THE BRIGHT SIDE OF NUCLEAR DESTRUCTION

The ongoing threat of nuclear war, it has long been assumed, has darkened the outlook of Western youth. But if the results of a survey by a Canadian psychiatrist are indicative, things are looking up. In fact, concludes Dr. Frank G. Sommers of Toronto, "our research suggests that kids who worry about nuclear war are psychologically stronger than those who don't."

Sommers surveyed 1,011 Canadian students aged twelve to eighteen, asking them a broad range of questions on future concerns. Of those, 10 percent reported that they thought about nuclear war on a daily basis and that those thoughts caused them a significant amount of anxiety. Yet that same group also felt the most empowered to do something to prevent nuclear war, and many of them reported that either they or their parents had taken some kind of direct and personal antiwar action. On the other hand, the much larger group

The most scared seem to cope best with the nuclear threat

(50 percent) that never thought about nuclear war also felt virtually unable to do anything to prevent it. "That," says Sommers, "is a red-flag finding."

Personally, he concludes, "I'm much more concerned about the larger group that doesn't worry. The world could go straight to hell, and they wouldn't do anything to stop it."—Bill Lawren

PEAT CRISIS IN IRELAND

According to Gaelic legend, it was in the sixteenth century that the English cut down most of Ireland's forests, presumably so that the heathen rebels would no longer be able to hide from the encroaching Englishmen.

That forced the Irish to start digging for peat, the first transitional stage that turns compressed plant growth into coal. And so it was that peat, a pungent material whose aroma pervades many a country lane and village, came to be used to heat little homes, to cook meals, and to fertilize small gardens. By the twentieth century the Midland peat bogs produced as much as 17 percent of Ireland's electrical power needs.

Now Ireland is running out of peat. In the last two years disastrously wet summers have cut the harvest. Thousands of bogmen are out of work, and the government has promised a £25 million loan to Bord na Mona, the agency that presides over an industry that some experts claim wears the emperor's new clothes.

One such expert is Richard Bradshaw of Trinity College, Dublin, who predicts that Ireland's greatest natural resource—4,000 to 5,000 years in the making—may well be gone in 20 years. To ward off that possibility, he is looking to Ireland's mountains for a substitute for bogland peat, which is stripped off in thin layers by enormous harvesters, milled into a fine powder, and then compressed into briquettes.

Mountain peat, however, rarely reaches depths of seven feet. Midland bogs go down as far as 29. In the Midlands, peat is easily harvested and easily transported. Not so in the mountains, with their ambiguous property claims, individual harvesters, grazing sheep, cross-country bikers, and terrain that makes access difficult for heavy machinery.

"The rate of erosion is accelerating," says Bradshaw. "What we need is a managed area in which to measure the effects of climatic changes and soil erosion. The Wicklow Mountains would be perfect."—George Nobbe

Peat bog: Ireland's greatest natural energy resource is fast disappearing, so Irish scientists are looking to the mountains

"It is precisely in its smallest and simplest structures that nature shows itself most perfect and accomplished."

—Pliny the Elder

"Aggressiveness is the principal guarantor of survival."

—Robert Ardrey

CONTINUUM

The giant clam: 100 pounds of hermaphroditic bivalve

GIANT CLAMS OF TONGA

Giant clams—some of them more than a yard long and weighing more than 100 pounds each—were a protein-rich dietary staple of the 170 islands that comprised the South Pacific kingdom of Tonga long before Captain James Cook renamed them the Friendly Islands in the 1770's.

Sadly, since then these huge clams have fallen on hard times. They are now considered an endangered species, threatened by avaricious islanders and hungry gastropods alike. The clams are bivalves adrift in a sea of marine biological ignorance that Richard H. Chesher hopes to clear up. He has come up with a three-year plan that might save these huge hermaphroditic bivalves from extinction by using an ancient taboo as an ecological tool.

His plan, which has the blessing of Tonga's King Taufa'ahau, is to build three sets of two concentric circles of *Tridacna derasa*, to use the species' proper Latin name. Two sets of circles will be placed off the Vava'u islands, and the other, in the Ha'apai island group. Sixty-six of the creatures will comprise the outer circle, 33 the inner one, and a single clam—the largest—will sit in the center. The configuration, for reasons long lost in Tongan antiquity, warns fishermen away. For equally obscure reasons, it stimulates the reproductive processes of the clam, whose increase in egg production is logarithmic. A single three-foot-long clam can lay more eggs than a million smaller individuals. Says Chesher, who has spent more than 20 years in Oceania, "There is something especially wrong with the idea of the extinction of such a magnificent and useful species. What works for Tonga could work for hundreds of other Pacific islands."—George Nobbe

PRIMES AND LOVE

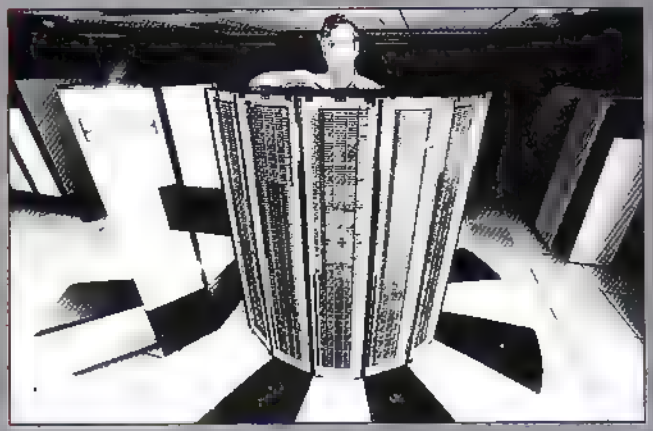
Software engineer Dave Slowinsky got a unique birthday present. Using a high-speed test program he wrote, programmers at Chevron Oil routinely trying out a supercomputer stumbled on the largest prime number (divisible only by itself and 1) ever discovered.

Programmers in Houston had been putting a new Cray X-MP supercomputer through its paces when the machine suddenly came up with the 65,050-digit number, long enough to fill nine *Omni* pages. The number, which starts off 1121212 and ends 1212121, took three hours to verify on the two-processor 400-million-calculations-per-second Cray.

Even more impressive to number theorists, however, is the fact that the figure is a rare Mersenne prime. Named after a fifteenth-century monk, Mersenne primes have the form $2^x - 1$, where x is also a prime number (for example, 7, which is $2^3 - 1$). There are only 30 specimens known, compared with billions of ordinary primes.

It's the fifth time Slowinsky's program has discovered a Mersenne prime since he launched it in 1959, when only 25 of the rare numbers were known. No one else has succeeded during that time.

Slowinsky's specialty is making computers run at top speed. "They told me only the fastest computers and cleverest programmers could have a hope of finding new Mersenne numbers," he says, "and I couldn't resist the challenge." He also hoped to impress a girlfriend, he confesses. "She didn't marry me, but now I guess I can ask again!"—Anthony Liversidge



If you had a Cray supercomputer, wouldn't you use its 400-million-calculations-per-second capacity to win back your girlfriend?

DEFEATING DEATH HORMONES

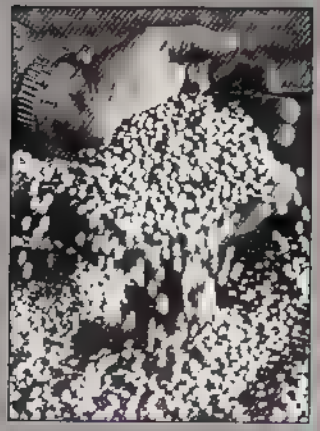
A mixture of synthetic hormones and minerals misted on the leaves of soybeans can help increase the plant's life span and boost yields by counteracting naturally occurring substances, dubbed death hormones, that apparently trigger the plant's deaths.

University of Michigan botanist Larry Nooden has spent the past nine years studying the regulatory mechanisms of soybeans, focusing on the self-induced death of the plants when their bean pods are developing. Nooden says his new treatment, which includes hormones like cytokinins and auxins, helps soybeans to prolong their lives and also helps the plants retain nitrogen late in their life cycle.

He says the hormone–mineral mixture might also be used as a misting agent on such supermarket vegetables as lettuce and spinach to retard spoilage. This use, however, would first require approval by the Food and Drug Administration.

Earlier in his research Nooden demonstrated that the size and age of soybean plants did not cause death. He once grew a 21 foot-tall soybean plant, compared with the normal size of two to three feet.

This and other experiments indicated to Nooden that a substance produced in the bean pods acts as a death hormone, killing the plant as the seeds develop. While studying this death agent, Nooden found that a natural cytokinin appeared to be working against the death hormone. Further experiments showed that a synthetic cytokinin in combination with a synthetic auxin produced even better results in prolonging the life span of soybeans. — Joel Schwarz



Soybeans. Now a plan to short circuit their suicide

Olmec head. Proof that the Peruvian Indians were African? No? Well, then would you believe the Mexicans were really Japanese? That's the new theory of a specialist in pre-Columbian art.

ANCIENT JAPANESE MEXICANS

"What was a Japanese wrestler doing in Mexico centuries before Christ was born?" That's a question Alejandro von Wuthenau, a professor and specialist in pre-Columbian art at the University of the Americas in Puebla, has been asking himself ever since he found a terra cotta statue of an Oriental athlete — dated between 1000 and 800 B.C. — in the mountains of Guerrero.

In fact, over the past 50 years, the eighty-six-year-old Von Wuthenau has found dozens of ceramic statues with Oriental features, some dated from 2000 B.C. These artifacts, he insists, show that the Japanese visited the Americas long before Europeans did.

After finding so many Asian-looking faces, I began to wonder how these people arrived here. They could have come only by boat," he insists.

And recently Von Wuthenau announced the discovery of what he believes may be a replica of a seafaring vessel used by early Asian explorers. The foot-long terra-cotta boat contains ten oarsmen figurines, says Von Wuthenau, with distinctly Japanese faces.

Von Wuthenau also claims to have discovered pottery showing ancient Africans and Jews. He believes this may point to a Jewish migration from Egypt to what is now Mexico around 500 B.C.

"The Peruvian Indians look very Asian, and the Olmec Indians have large African lips and heads," he points out. "This, plus the figurines, leads me to believe that the Americas were visited by people from all over the world who settled from what is now Peru to Arizona. I think those ancient explorers probably came with a specific purpose in mind, to form a cosmic race. I call the process the great genetic lottery." — Sherry Baker

CONTINUUM

HERPETOLOGICAL [illegible]

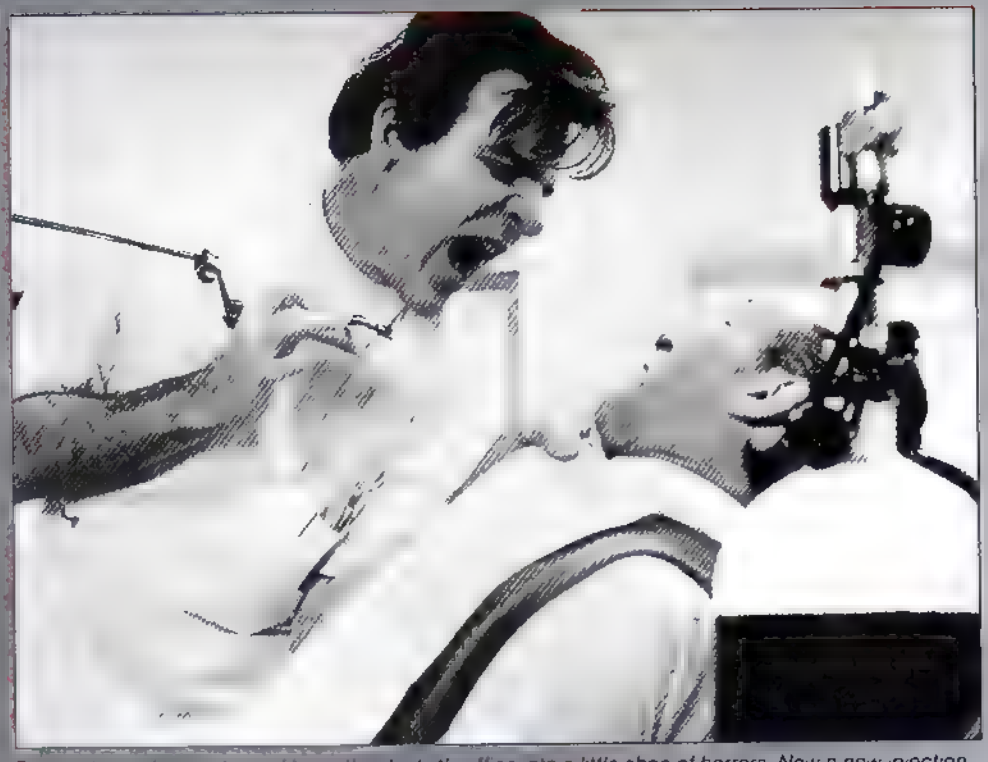
Long before the dinosaurs had vanished the amiable leatherback turtle was plodding by night up the beaches of Laganá Bay, on the shores of Zákinthos in the Ionian Sea depositing clutches of eggs the size of Ping Pong balls in warm, wet sand

As many as 800 leatherbacks some weighing 240 pounds still come ashore to lay their eggs and camouflage their nests between June and August

But in recent years the leatherbacks, a threatened species, have gazed in herpetological horror as a booming tourist industry on the west side of the island—population 36 000—has begun to disrupt their fragile environment with cafés and hotels, bright lights along the causeway and the noisy thud of disco music Some enterprising Zákinthians even started taking customers to the bay to watch the turtles Their flashlights frightened the shy creatures and disoriented their hatchlings who sometimes headed away from the water instead of toward it

Leatherback Battling cafés, bright lights, and discos

These turtles are very easily disturbed, says John Behler curator of herpetology at the Bronx Zoo in New York A new piece of legislation is working its way through the Greek parliament in an effort to enable man and turtle to coexist Says Behler "On paper it will provide protection But in actuality it probably won't really accomplish much when you consider the power of the development interests "—George Nobbe



For most people a root canal turns the dentist's office into a little shop of horrors Now a new injection technique cuts the filling time down from the current 45 or 50 minutes to 10 or 12 seconds

ROOT CANALS AND GOLF BALLS

Gutta-percha a rubbery, adhesive gum from the leaves of several Southeast Asian trees, has been used in dentistry since 1840 for root canal surgery

But Andrew Michanowicz an endodontist and University of Pittsburgh professor of dentistry has developed a procedure that involves injecting the substance directly into the tooth with a disposable needle rather than using the current method of manually placing 10 to 20 gutta percha cones resembling toothpicks into the canal it's a technique that spares both patient and dentist a lot of wear and tear cutting the root canal filling time down from 45 or 50 minutes to 10 or 12 seconds

'In the old days,' says Michanowicz, 'the dentist would kill the nerve, pull the tooth, and build you a partial bridge Today we remove the nerve seal it off, and remove the damaged tissue Then we apply heat to the gutta percha to soften it and inject it to fill the canal

Gutta-percha is marvelous stuff It was used to insulate the first transatlantic cable At one time golf balls were called 'gutties because they were filled with it ' he says

-George Nobbe

THE GRASER

Scientists at the Los Alamos National Laboratory are conducting experiments they hope will lead to the world's first gamma-ray laser—a device they fondly call a "graser"—which one day may revolutionize biological research, surgery, and even telecommunications.

Preliminary tests show the scientific principles on which this arcane contrivance is based are sound. But the researchers admit that right now they are working in uncharted areas, trying to build a technical foundation for the futuristic instrument.

Reduced to its simplest terms, the graser would be energized by isomers, a class of materials produced in nuclear reactors. The problem, according to Peggy Dyer, a nuclear physicist at Los Alamos, New Mexico, is to find the right isomer, purify it, and learn how to incorporate it into a special type of crystal—which would be the heart of the graser—without destroying the crystal itself. If they succeed, the crystal will emit a high-energy beam in much the same way conventional lasers produce high-intensity, coherent, amplified light.

At some point someone is going to make a graser. It's just a matter of whether it will take three years or thirty," says Dyer, adding that such a device could, among other things, function as a sophisticated microscope capable of creating three-dimensional images of living cells; replace scalpels and other instruments used in

Coming soon: A superlaser with a beam of gamma rays

delicate surgical procedures; and transmit a vast volume of satellite messages around the globe. George Nobbe

"Creative imagination must stop well short of delirium."
—Calvin Wells

"You have all the characteristics of a popular politician: a horrible voice, bad breeding, and a vulgar manner."
—Aristophanes

THE COCKROACH LINK

From Cain to cockroaches. It sounds like a farfetched family tree, but man and creepy, crawly cockroaches may be kissin' cousins, half a billion years removed.

That's the word from U.S. Department of Agriculture (USDA) scientists who, in the never-ending struggle to control the cockroach population, stumbled upon a hormone in cockroach brains that resembles a human hormone. In people and cockroaches, the hormone is a neuropeptide that controls the digestive tract.

Government scientists in California and Texas discovered the hormone, which they call leucosulfakinin, while analyzing the mashed heads of 3,000 cockroaches. The researchers claim the substance bears an uncanny resemblance to at least two neuropeptides found in the brains and guts of humans, called gastrin II and cholecystekinin, or CCK.

"The homology [the degree of similarity] is so great that it precludes a coincidence," explains USDA chemist Ronald J. Nachman. "They are related, and that implies a common origin."

What the scientists are *not* attempting to do is prove to creationists that mammal and insect life had from the same primordial soup, although it's further evidence that evolution did take place," says Nachman.

Because the neuropeptide aids in the digestion of food, Nachman and others believe that if they can interfere with it, they can slow down the pesky insect or even kill it. Scientists, however, cannot simply extract the neuropeptide itself to alter the cockroach's genetic code. "We must use it as a model or template," states Nachman, "to design new and specific insecticides." If nothing else, the scientists hope to starve the roach or at least upset its water balance.

And just how far-reaching is the discovery? According to Nachman, the hormones are more similar than any others found in man and insect to date. "We do believe, though, this is not unusual—that this particular hormone will be found in other insects." Michael Dale

Don't squash that roach; he may be your cousin—neuropeptidally speaking. Cockroach and man, it seems, share a common brain hormone.

"Man is nothing else than fetid sperm, a sack of dung, the food for worms. You have never seen a viler dunghill!"
St. Bernard of Clairvaux

"Experience is a comb that nature gives us when we are bald."
Belgian proverb

CONTINUUM

SATELLITE GEOGRAPHY

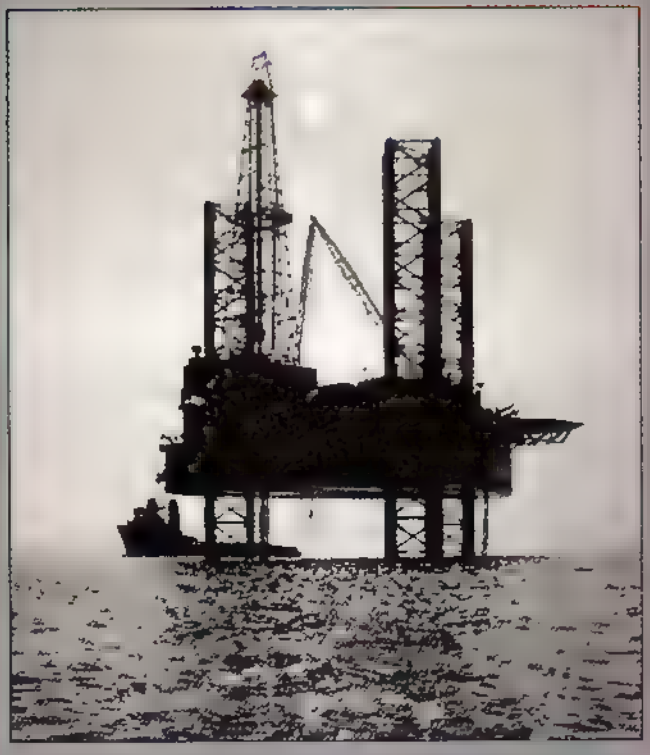
In case you needed proof even in the waning years of the twentieth century that geography remains at best an inexact science consider what satellite mapping has done to the territorial claims of England and Ireland in the Celtic and Irish seas

It seems that the British have been using maps drawn up in presatellite times The Irish have not Using more modern technology, that is, the satellite, they have proved that Ireland owns some 85 feet to the north and 394 feet to the west more than it thought it owned That's thanks to five American TRANSIT satellites now circling the globe in relatively low orbits

Their figures have led to internationally agreed-upon calculations about who owns what in the channels that separate England from the Irish Republic

A source of much amusement to Ireland these findings won't bring smiles to many English faces especially if oil is discovered in either the Irish or Celtic seas According to Cheryl Trench of Petroleum Research Associates in New York "Ireland has several gas fields that are now operative Some fifty-four blocks are now being offered for leased exploration" she adds

The British have attempted to downplay the whole geographical mix-up, which in this case could yield Ireland millions of dollars even though their claim is based on just a few feet



If oil is discovered in either the Irish or Celtic seas the Irish will be millions richer, thanks to high-tech satellite mapping

Says John Dixon a senior lecturer in surveying at the Dunsink Observatory at the Bolton Street College of Technology Thanks to satellites our ability to measure the earth has improved, and whereas before we had to do everything locally now we can get a far better determination by computing the radii of the whole earth"

—George Nobbe

"A man is as old as his arteries"

—Pierre J G Cabanis

"Time whose tooth gnaws away everything else is powerless against truth!"

—Thomas Henry Huxley

CROSS-CULTURAL DREAMING

If dreams are the "universal language" then there are more things separating the Chinese and Americans than a Great Wall

For the most part dreams are seen as sweet and beautiful in the West but dreaded in the People's Republic of China according to psychologist Joan Walls who is conducting pioneering cross cultural dream studies in conjunction with colleagues in the United States and China

When Walls and colleagues at Appalachian State University gave dream questionnaires to 271 Chinese college students and 340 American students she found that only 13 percent of the Chinese believed having many dreams is good for a person's health while a resounding 81 percent of the Americans felt that way

In addition most Americans (89 percent) like to dream while only 29 percent of the Chinese do Also the Chinese are more afraid of having bad dreams than are Americans

Why? Walls believes the Chinese qualms are rooted in the belief that illness is reflected in dreams If you hold the belief that having a lot of dreams indicates discomfort Walls speculates "then dreaming is not as desirable an activity as it would be for us

Here are the other major differences between Eastern and Western dreams

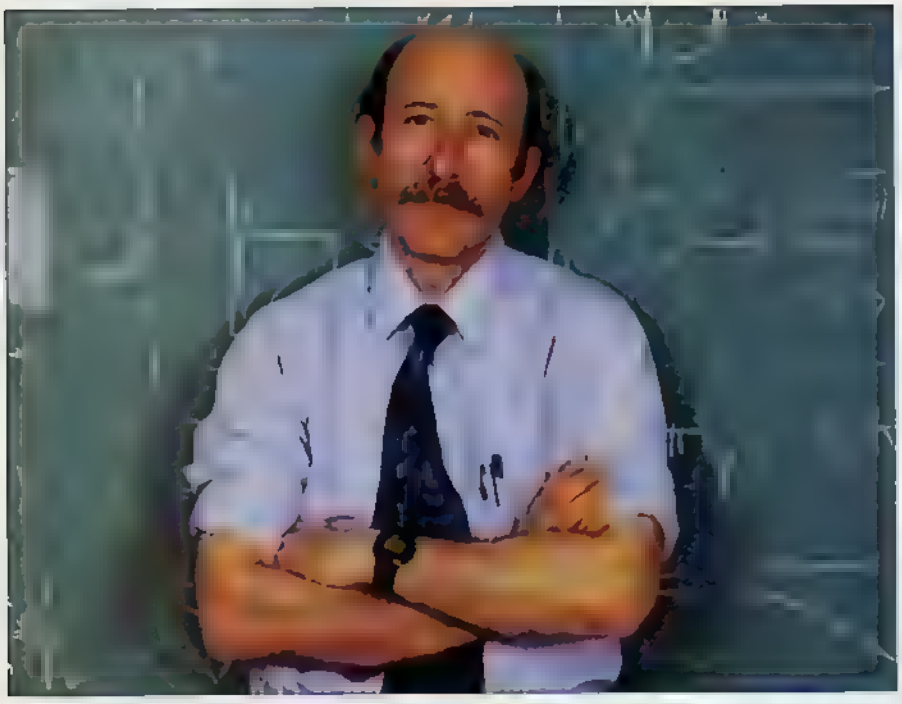
- Most Americans (74 percent) dream in color as compared with just 28 percent of the Chinese
- Americans dream more about finding or losing money and valuables
- Both cultures dream about people I love but Americans dream of sweethearts much more often than the Chinese do
- More Americans dream of sexual experiences 95 percent compared with only 41 percent of the Chinese

"We are the sons and daughters of Freud" adds Walls "and people in America are very interested in dreams There is not that kind of heightened awareness of dreams and dream life in China Michael Dale

MAY THE FORCE BE WITH YOU

BY BRUCE SCHECHTER

Fischbach's new force might help revolutionize technology, develop a unified field theory, and decide the ultimate fate of the universe



'an ron ball of one hundred pounds fall ng from a height of a hundred cubits reaches the ground before a one pound ball has fallen a single cubit.' Trying the exper ment himself Ga leo found that the arger precedes the smaller by two fin ger's breadths —and th s was probab y due to a r res stance

By modern standards two fingers is quite a lot And physic sts continued to wonder whether gravity acted on a l th ngs equally—whether a materials, regardless of weight or structure fa at precise y the same rate In the late 1600's Newton used a pendu um to show that all bodies fa at the same rate to w th n about one percent And n the early 1900's Roland Eotvös, a Hungar an baron and physicist, decided t was worth doing the exper ment to an even greater degree of accuracy

Eotvos realized it would be hard to achieve th s accuracy by dropp ng or swinging weights and besides he had a better idea Working in the basement of the un vers ty that now bears his name he made a t ny barbell a st ck with test weights on either end The barbell was balanced and suspended from its center by a ong, th n quartz f ber The weights were pulled downward by gravity and pushed sideways by the centr fuga force of the earth's rotation By carefully balanc ng these two forces Eotvos showed that no matter what the composition weights fa l at speeds that vary by less than one part n a bi on

Finally n 1964, physicist Robert Dicke of Princeton d d exper ments that were a hundred t mes more sens t ve than Eot vos's nstead of measuring the rate at which objects fal to Earth he used an ul trasensitive balance to earn how objects on Earth are influenced by the grav ta tional force of the sun and moon His measurements complete, he showed that the sun and moon do indeed tug at earthly objects But he found no evidence that the we ght or structure of the test object af fected the grav tat ona force

These exper ments conv nced physi c sts of the truth of Ga leo s assertion Since even a minute force would have shown up n D cke's extremely precise exper ments, the mp ca on was that gravity and grav ty alone, acted between bits of matter

But Fischbach who had spent years look ng for ev dence of a new force, was not conv nced He saw what so many had overlooked that if a new force acted only over a short distance—a few hundred yards say—it would not have shown up in the Dicke exper ment, wh ch measured on y forces that cou d reach from the earth to the sun Such a force m ght however show up in the Eotvos experiment To find out if he was right requ red only a trip to the junkyard of science—the brary and a return to the habits of h s youth

Fischbach s approach to sc ence is rooted n a fascinat on w th the ord nary, a knack for glimpsing magic n the mun dane H s grandfather was a carpenter he explains, and his father, a lawyer w th an interest in building things As a boy grow ng up n Brook yn, he followed those pa ternal inc nat ons t nker ng n his father s basement workshop for fun

He was a br ght kid and soon he made his first important d scovery A gas stat on w th a first rate garbage can was only two doors away Every day Ephraim would f sh out some new treasure One day t was an old carburetor, the next it m ght be a refrig erator compressor (run backward, th s makes a nifty vacuum pump) a high volt age neon s gn transformer, a handful of gears or who knew exact y what Whatever dross he found was transmuted nto treasure by h s mag nat on

W th the fruits of his trash-barrel p ck ng and w th chemicals donated by an uncle who was a chem stry professor at Colum bia Un versity Fischbach built h mself an att c lab "I took t nk from the gas stat on, junk from this junk from that and put t to gether to see what I could come up w th.

"The pants disintegrated, okay? I was standing there completely naked. I realized that this was a problem, because even in New York there are limits to what you can do."

he recent y recalled while scann ng his of fice, which is crammed w th museum re productions, typed quotat ons ('Great spirits have always encountered violent op position from med ocre m nds' —E nstein), a chunk of meteorite A Ca der mob le, bal anced like some insane Eötvös experi ment hangs from the ceil ng Today a smal, th n man, bald at the top, with a droop ng mustache and vintage Brooklyn accent F schbach adm ts that most of the things he built from h s scavenged treasures were pretty use ess But they taught him the va ue of what most people just throw away

Fischbach entered Columbia Un versity in 1959 Soon he was overnight babys tter for a huge experiment devoted to iso at ng a rare isotope of oxygen He st l keeps a p cture of the experiment, wh ch resem bles an o l refinery crammed into a broom closet on h s office wall Though he has forgotten many of the deta s of this nt cate experiment he does remember that it used a lot of nitric ac d wh ch was for ever leak ng from hundreds of tubes

Nitr c acid s funny stuff It weakens tex t le fibers so they just crumb e nto dust Returning home one day after a long weary shift F schbach undressed and found that his underpants had dissolved *Ah well*, he thought and went to bed

"The next day I went on the subway with a new pa r of underpants obv ous y but the same Lev s he says It was the Broadway/Seventh Avenue ne You know wa to wa people You could die on the spot but you d st l be stand ng up be cause there's no p ace to fa Sudden y I noticed or fe t that my pants had disinte grated r ght around the gro n What im med ately rea zed was that there was th s topological fact that for the n tr c acid to get to my underwear t had to pass through my Lev s The pants entire y d s ntegrated okay? Now I was stand ng there com p ete y naked I rea zed that th s was a problem because even n New York there are l m ts to what you can do I just had a T-shirt on and I stripped to the waist and wrapped the T sh rt around my legs I was total y bare-chested, and n those days, that was also r d cu ous People were look ng at me what the hel was go ng on? So I had to go for an hour and a ha f back to Brook yn, hoping nobody would see that I had no pants on Th s nc dent had a ma or negative effect on me "

But there were compensat ons To pass the time wh le work ng on the n ght sh ft Fischbach read One day, wh e searching through the D tmus Avenue branch of the Brook yn Pub c Library for a Sher ock Ho mes book he came across an unusua book by Lil an Lieber about Einstein s genera theory of re at v ty t was f l ed with amus ng drawings, and the text read like a poem, but it was possible to learn the ru d ments of general relativ ty from t In those days Einstein's theory of relat v ty had a reputat on among laymen for be ng prac t ca y incomprehens ble—only about a dozen peop e in the world supposed y understood it (Einstein once remarked that of these dozen he had met about four hun dred) Intr gued, Fischbach took the book out and began read ng I said, Look th s stuff s hard but it's not that hard I can understand th s That book and my pants dissolving took me out of chem stry and nto physics "

By the t me he reached graduate schoo at the University of Pennsylvania he be gan root ng around in old phys cs journals as f they were the trash b ns of his youth He was soon taking a l tle b t of this a l tle bit of that and putting it together to come up with some clever l tle th ng worthy of pub cation He became a working-class physic st Those who knew him trusted that he would turn out good competent work

Fischbach totted up a respectable ist of pub cations He worked hard at h s phys cs taught his courses got married had three kids And as the years passed, his interest n the scient fic junkyard—n th s case, the rea m of discarded anoma es conv nced h m there just might be a hid den un versa force

The great science h stor an Norwood Russel Hanson once descr bed anoma es

as the "windows through which the anatomy of the universe can be witnessed." And in 1979 Fischbach and collaborator Sam Aronson of the Brookhaven National Laboratory in Upton, New York, found themselves a new window in the form of the kaon—a type of elementary particle that exists only 10 billionths of a second before decaying into lighter particles. Einstein's theory of relativity predicts that as a kaon or any other particle or object, for that matter—approaches the speed of light, its lifetime will increase. The reason is Einstein's well-documented finding that at near-light speed, time literally slows down. But scientists at the Fermi National Accelerator Laboratory in Illinois found that the kaon's lifetime did not increase as rapidly as predicted by Einstein's equations. Perhaps Fischbach and Aronson reasoned, that was because some mysterious force was slowing down the kaon.

They hypothesized that if a new force existed, it might be coupled to something called *hypercharge*—a still-hypothetical repulsive force supposedly proportional to the total number of protons and neutrons in an atom. If hypercharge caused kaons to slow down, it would probably influence other forms of matter as well. While Fischbach and Aronson were wondering just where else this new force would show up, they heard about the work of an Australian physicist named Frank Stacey.

For the past few years Stacey and his graduate students had been going down into deep mines to measure the acceleration of gravity. With less mass between themselves and the center of the earth, they knew, gravity would exert less pull, and the gravitational acceleration of their test particles would decrease. That's what they found—except that the force of gravity did *not* decrease in exactly the fashion predicted by Newton's well-loved laws. The implication was clear. Either Newton was wrong (not a happy idea) or, as Fischbach was quick to see, a new force was mucking up the works.

Fischbach soon began casting about for still other experiments in which a new force might have surfaced. And then in September 1985 he realized the old Eotvos experiment was sensitive enough to detect a force of the magnitude glimpsed in the Australian mines. He took a quick trip to the library, where, after some searching among the dusty old journals, he found the Eotvos paper. "I leafed through it," Fischbach says. "Then I saw a table, and I was absolutely stunned."

The table listed differences in the rates at which the test masses had fallen. Had Eotvos's experiment been perfect (and had there been no other forces), these numbers should have been zero. They weren't. "I was shocked to see in the paper that there was a result that was four standard deviations [a measure of statistical significance] from zero, there was a number two standard deviations from zero, and so on and so forth," Fischbach explains. "But without detailed calculations, it was impossible to know whether these results meant anything."

So he did what any other respectable physicist would have done under the circumstances—he dumped the paper on one of his graduate students, a large sandy-haired kid from Indiana named Carrick Talmadge, and took off for the weekend. Talmadge recalls Fischbach saying to him, "I'm sure there isn't anything here, but just to humor me, you might as well try to check some of these."

Eotvos had compared the gravitational accelerations of whatever substances were handy: water, copper, copper sulfate, platinum, tallow, asbestos, and even bits of snakewood. Had Eotvös known about hypercharge, which wasn't hypothesized until the Sixties, he might have done what Talmadge did that weekend. He might have made a graph comparing the gravitational accelerations of the test masses with their hypercharges. If hypercharge were truly working in opposition to gravity, substances more affected by hypercharge would *appear* to be less affected by gravity. The greater the ratio of hypercharge to mass, the smaller their acceleration. Thus a proportional relationship would always exist. If gravity were on one axis, and hypercharge on the other, then the points of the graph would always fall on a straight line. Talmadge was amazed as the points fell one by one all too on the line. It was just inconceivable, Talmadge recalls. "You've predicted that there's an effect in the Eotvös experiment. You go out and look for it, and there it is. It's just short of saying you've proved there's a force."

Soon Sam Aronson and Fischbach's two other graduate students, Daniel Sudarsky and Aaron Szafer, were checking Talmadge's work. The Eotvos data seen in the new light of hypercharge, seemed to say that a feather falling 30 feet would beat a chunk of lead falling the same distance by about a billionth of a second. The reason: A pound of lead, with a greater number of more densely packed protons and neutrons, has a greater hypercharge than a pound of feathers. The hyperforce which literally pushes up from the earth slows the lead's descent.

Theory in place (and a physics revolution in the wings), Fischbach could no longer sleep. He was writing the paper that would announce his results to the world, and he knew that if he made even a tiny mistake the world would pounce.

Getting a scientific paper published can be a long, Byzantine process. Before the editors of a journal like *Physical Review Letters* will print a paper, it must be read and okayed by at least two outside experts in the tiny subfield of the paper. Fischbach suspected that one referee would be Robert Dicke, the eminent physicist and gravity expert who had tested the gravitational force of the sun. If Dicke said the paper was okay, then at least it would be published. And if Dicke could find no errors

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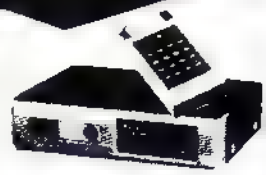
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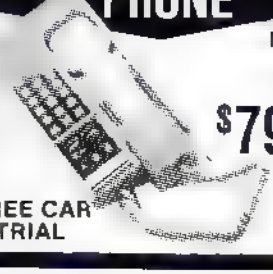
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Someday magicians will change the color of the sky, stop Earth from rotating, and saw Manhattan in half

GRAND ILLUSIONS

BY RICKY JAY

On a recent broadcast of *Saturday Night Live* a verbally uncommunicative magician named Teller sat at a sophisticated computer terminal in an NBC studio. His partner, Penn Jillette, who more than compensates for Teller's silence, accosted a couple in Times Square and insisted they select one playing card from a standard pack of 52. Penn flashed a fan of the remaining 51 cards in front of a TV camera; this information was relayed to Teller, who immediately instigated a graphically displayed computer search. Working at lightning speed, the computer sorted through the deck, checked which cards were present and instantly identified the card selected by the couple on the street. Teller relayed the information to his partner by having it appear on the huge electronic billboard high above Times Square. The participants whose backs faced the billboard were startled when Penn proudly revealed the name of their chosen card.

Is this simply a parody of high technology—an elaborate joke based on a technique witnessed and described 400 years ago by Francis Bacon? Or is this event an augury of things to come in the world of magic, a glimpse of the twenty-first century when magicians will rely on an impressive arsenal of computer, laser, fiberoptic and hologram technologies to astound an increasingly sophisticated audience?

For centuries magic, science, religion and philosophy were closely linked. In ancient Greece, for example, temple doors opened mysteriously to the accompaniment of thunderclaps and lightning, animated statues poured sacred libations and oracles delivered predictions in oracular argon. The principles of hydraulics, acoustics and optics formed the basis of these strange phenomena, which were more likely to create devotees than to impress audiences.

By the eighteenth century, when magic was first viewed in theatrical settings, the showmen were often self-styled professors of natural philosophy who demonstrated as mystic effects scientific devices unknown to the public. Katterfelto, who performed magic and lectured on philosophical, mathematical, optical, magnetical, electrical, physical, chymical, pneumatic, hydraulic, hydrostatic, stygiographic, palenchic and caprimantic arts, did exhibit an actual solar microscope. But he was more the target of scorn than the subject of praise and was even jailed as a

PAINTING BY MICHAEL PARKES

rogue and vagabond. At the same time, however, one could be mystified by remarkable mechanical figures, a lifelike duck that could groom its feathers, eat and drink, men who beat a drum with precision or played delicate tunes on the flute, and a wonderful machine that drew portraits.

A computer that plays chess may fascinate, but it would not mystify modern-day spectators. In the 1760's, however, a life-size turbaned Turkish chess-playing machine was built to please the Austrian empress Maria Theresa. To audiences already familiar with wonderful automata, a machine that can think and play chess could be considered a reality. Capitalizing on such thought and using his own reputation as a skilled scientist and mechanic, the Hungarian baron Wolfgang von Kempelen fooled audiences by cleverly concealing a human director within the complicated but nonfunctional gears and levers of his chess machine.

It disturbed Von Kempelen that his fraudulent chess player caused a sensation, but his creation of a machine able to re-create human speech was all but ignored—largely because a magician's trick version of such a speaking machine which relied on information transferred by concealed tubes had been exposed. The British scientist Sir Charles Wheatstone built a crude model of Von Kempelen's speaking machine, which intrigued a youngster who happened to see it. The boy built a pretty fair speaking machine of his own. His name was Alexander Graham Bell.

In the early 1800's a Belgian optician, Robertson, created a show called *Phantasmagoria*. Using scientific principles, he conjured up images of skeletons and resurrected dead heroes of the French Revolution before terrified audiences.

The technology that produced the frightening images was based on the use of aptly named "magic lanterns," which when first constructed in the seventeenth century, commanded the attention of prestigious scientists like Kircher, Huygens, Dechales, and Robert Hooke. By the early nineteenth century, showmen had so perfected these techniques that one Andrew Oehler combined projection with roars of thunder, bolts of lightning, and electric shocks. He so frightened the governor of Mexico that the magician was thrown into a dungeon 150 feet underground.

By the middle of the century the art of producing ghosts had become a theatrical specialty. Images were reflected on sheets of glass, allowing actors to joust with phantom forms. These glass reflections no doubt gave rise to the frequently echoed phrase "It's all done with mirrors."

In the nineteenth century even more interesting examples of the wedding of magic and science were realized. Robert Houdin, the great French conjurer and "father of modern magic," came out of retirement to accept a mission from his government. He traveled to Algeria, where the Marabouts, a sect of magic-worshiping religious fanatics, were attempting to incite a revolution against France. He performed a "dueling banjos" match with Marabout chieftains. He invited an Algerian of great strength to mount the stage and try to lift a small wooden chest by its brass handles. This was accomplished with ease. Robert Houdin then waved mysteriously at the Arab, claiming he would make him as weak as a child. When the Arab again tried to lift the chest, it would not budge. Renewing his efforts, he grabbed the handles of the chest and suddenly started to shake convulsively, eventually collapsing on the stage. Robert Houdin, with another wave of his hand, ended the Arab's agony.

Modern readers can no doubt intuit the method: below the stage, a huge electromagnet in the chest, a concealed iron sheet, and a hidden induction coil that fed to the brass handles of the chest, providing the shock. But in the middle of the nineteenth century, such technology was unknown and remarkably effective.

> *"In what must have been the strangest of stage acts, ice cream was made in less than a minute, flowers were frozen solid, and rubber balls became as fragile as glass."*

In 1898 Nevil Monroe Hopkins published a trick in which an apparently solid silver miniature elephant—isolated atop a pedestal and covered with a simple shade—completely vanished. Hopkins had molded the elephant in mercury and had it frozen solid by the evaporation of carbonic acid dissolved in ether. When the figure melted, it drained into a hole in the pedestal, disappearing without a trace.

Teakettles became the focus of two important technological magic effects early in this century. In a music-hall act an ordinary kettle was placed on a block of ice, and to the musical accompaniment of "Polly Put the Kettle On," the liquid inside began to boil. The billowing steamy liquid was poured into the hats of spectators in the front rows, in what must have been one of the strangest of successful stage acts: ice cream was made in less than a minute, flowers and grapes were frozen solid when put in contact with the "mystic water," and rubber balls became as fragile as glass. The act—performed by Minola Mada Hurst, Queen of the Magic Kettle—was nothing more than a demonstration of the properties of liquid air, at that time largely unknown to the general public.

The Talking Teakettle introduced by amateur magician David P. Abbott also caused a sensation. A kettle was handed to spectators whose questions were answered as they held the spout to their ears. A faint, distinct voice emanating from inside the kettle astounded audiences of the preradio era. Abbott's method was inductive. Six thousand feet of very fine wire and a receiver were wrapped inside a papier-mâché kettle, and an unseen accomplice with a sending coil and a series of dry cell batteries answered the questions from the basement of Abbott's house.

Of all the technologies available to or developed by magicians in the years directly preceding and succeeding the turn of this century, none was more important than the development of the motion picture. Although magicians were the subjects of early films, the developers of trick films and special effects and the presenters of cinema in their stage shows, for the first time they found their own illusions less magical than the technology of film itself.

Technological advances were no longer the secret weapons of the magician but an important tool in the *presentation* of magical illusions. Instead of using new scientific principles, the stage performer spoke about them, couched his presentations with references to them, and created illusions around them.

The utterly astounding technological advances we now take for granted, as well as the prognostications for even more remarkable achievements in the future, will, I think, lead magicians of the twenty-first century back to basics. No longer will they be Connecticut Yankees in King Arthur's Court, relying on the latest scientific advances to fool the public. They will, I believe, turn more to effects of pure sleight of hand—conjuring with such everyday objects as cups, balls, cards, and coins—to provide a contrast to the very technology with which they will be unable to compete. They will rely on this simple but difficult path because magic is ultimately a live, intimate, personal, and emotional art form best experienced at close range.

Leading professional and amateur magicians however have widely different visions of magic in the twenty-first century.

Martin Gardner, who has brought mathematics and magic to life for millions of readers through his *Scientific American* columns and numerous books, is an extremely creative conjuring enthusiast.

Analyzing the trends of the last 20 or 30 years, Gardner speculates that there may be more women and blacks gaining prominence as magicians in the future. But technological advances with lasers and holograms, he feels, are less likely than the development of incredibly strong but very thin, undetectable fibers that might lift a person off the ground.

The major trend today, says Gardner, is the influence of television on magic. "David Copperfield's vanishing Statue of Liberty,

CONTINUED ON PAGE 110

FICTION

BABEL'S CHILDREN

Making decisions can be child's play, even when the results affect the fate of the world. Just follow the rules and win the game

BY CLIVE BARKER

Why could Vanessa never resist the road that had no signpost marking it, the track that led to God alone knew where? Her enthusiasm for following her nose had got her into trouble often enough in the past. A near-fatal night spent lost in the Alps; that episode in Marrakech that had almost ended in rape; the adventure with the sword-swallower's apprentice in the wilds of Lower Manhattan. And yet despite what bitter experience should have taught her, when the choice lay between the marked route and the unmarked, she would always, without questions, take the latter.

Here, for instance. This road that meandered toward the coast of Kithnos: What could it possibly offer her but an uneventful drive through the scrubland hereabouts—a chance encounter with a goat along the way—and a view from the cliffs of the blue Aegean? She could enjoy such a view from her hotel at Merikha Bay and scarcely get out of bed to do so. But the other highways that led from this crossroads were so clearly *marked:* one to Loutri, with its ruined Venetian fort; the other to Driopis. The fact that they were so clearly named seriously marred their attraction for her. This other road, however, though it might—indeed probably *did*—lead nowhere, at least led to an *unnamed* nowhere. Thus fueled by sheer perversity, she set off along it.

The landscape to either side of the road (or, as it rapidly became, *track*) was, at best, undistinguished. Even the goats she had anticipated were not in evidence here, but then, the sparse vegetation looked less than nourishing. Unlike Santorin, with its picturesque volcano, or Mykonos—the Sodom of the Cyclades—with its plush beaches and plusher hotels, the island Kithnos could boast nothing

PAINTING BY SALVADOR DALI

that might draw the tourist That in short was why she was here as far from the crowd as she could conspire to get

The cry she heard from the hillocks off to her left was not meant to be ignored It was a cry of naked alarm and it was perfectly audible above the grumbling of her rented car She brought the ancient vehicle to a halt and turned off the engine The cry came again but this time it was followed by a shot and a space then a second shot Without thinking she opened the car door and stepped out onto the track The air was fragrant with sandflies and wild thyme scents that the petrol stench inside the car had effectively masked Even as she breathed the perfume she heard a third shot and this time she saw a figure mounting the crown of one of the hillocks only to disappear into a trough again Three or four beats later and his pursuers appeared Another shot was fired but she was relieved to see into the air rather than at the man They were warning him to stop rather than aiming to kill The details of the pursuers were as indistinct as those of the escapee except that an ominous touch— they were dressed from head to foot in billowing black garb

She hesitated at the side of the car not certain of whether she should get back in and drive away or go and find out what this hide and seek was all about The men in black had disappeared after their quarry, but she pinned her eyes to the spot they had left and started off toward it

She picked her way among the squirting cucumber for forty ten minutes before she became certain that she had missed the spot from which pursued and pursuer had vanished—and by that time she was lost in a sea of grass crested knolls The cries had long since ceased the shots too She was left only with the sound of the guns and the rasping debate of cicadas around her feet

She selected the largest hillock and trudged up its flank her feet uncertain in the sandy soil to see if the vantage point offered a view of the track she'd left or even of the sea If she could locate the cliffs she could orient herself relative to the spot on which she'd left the car and head off in that approximate direction knowing that sooner or later she'd reach the track But the hummock was too puny all that was revealed from its summit was the extent of her solation in every direction the same indistinguishable hills raising their backs to the afternoon sun In desperation she licked her finger and put it up to the wind reasoning that the breeze would most likely be off the sea and that she might use that slender information to base her mental cartography upon The breeze was negligible but it was the only guide she had and she set off in the direction she hoped the track lay.

After five increasingly breathless minutes of tramping up and down the hillocks she scaled one of the slopes and found herself looking not upon her car but at a cluster of whitewashed buildings dominated by a squat tower and ringed like a garrison with a high wall It immediately occurred to her that the running man and his three overattentive admirers had originated here and that wisdom probably counseled against approaching the place But then without directions from somebody might she not wander around forever in this wasteland and never find her way back to the car? Besides the buildings looked reassuringly unpretentious There was even a hint of foliage peeping above the bright walls that suggested a sequestered garden within where she might at least get some shade She headed toward the entrance

She arrived at the wrought iron gates exhausted The trudge across the hillocks had reduced her thighs and shins to quivering incompetence

One of the large gates was ajar and she stepped through The yard beyond was paved, and mottled with doves' droppings: Several of the culprits sat in a myrtle tree and cooed at her appearance From the yard several covered walkways led off into a maze of buildings Her perversity unchastened by adventure, she followed the one that looked least promising and it led her into a balmy passage lined with plain benches and out the other side into a smaller enclosure Here the sun fell upon one of the walls in a niche of which stood a statue of the Virgin Mary her notorious child fingers raised in blessing, perched upon her arm And now seeing the statue, the pieces of this mystery fell into place The secluded location the silence, the plainness of the yards and walkways this was surely a religious establishment

She had been godless since early adolescence and had seldom stepped over the threshold of a church in the intervening twenty-five years Now at forty-one she was past recall and so felt doubly a trespasser here But then she wasn't seeking sanctuary, was she? Merely directions She could ask them and get gone

As she advanced across the sunlit stone, she had that curious sensation of self consciousness that she associated with being

"One of the large gates was ajar, and she stepped through. The yard beyond was paved, and mottled with doves' droppings: Several of the culprits sat in a myrtle tree and cooed at her."

spied upon It was a sensitivity her life with Ronald had sophisticated into a sixth sense His ridiculous jealousies—which had only three months earlier, ended their marriage—had led him to spying strategies that would not have shamed the agencies of Whitehall or Washington Now she felt not one but several pairs of eyes upon her Though she squinted up at the narrow windows that overlooked the courtyard and seemed to see movement at one of them nobody made any effort to call down to her, however A mute order perhaps their vow of silence so profoundly observed that she would have to communicate in sign language? Well so be it

Somewhere behind her she heard running feet several pairs rushing toward her And from down the walkway the sound of the iron gates clanging closed Her heartbeat tripped over itself and alarmed her blood Started, it leaped to her face Her weakened legs began to quiver again

She turned to face the owners of those urgent footsteps and as she did so, she caught sight of the stone Virgin's head moving a fraction Its blue eyes had followed her across the yard and now were unmistakably following her back She stood stock-still *best not to run*, she thought *with Our Lady at your back* It would have done no good to have taken flight anyway, because even now three nuns were appearing from out of the shadow of the cloisters their habits billowing Only their beards and the gleaming automatic rifles they carried fractured the illusion of their being Christ's brides She might have laughed at this incongruity but that they were pointing their weapons straight at her heart

There was no word of explanation offered but then in a place that harbored armed men dressed as nuns, a glimpse of sweet reason was doubtless as rare as feathered frogs

She was bundled out of the courtyard by the three holy sisters, who searched her high and low as though she had just razed the Vatican She took this invasion without more than a cursory objection Not for a moment did they take their rifle sights off her and in such circumstances obedience seemed best Search concluded one of them invited her to re-dress and she was escorted to a small room and locked in A little while later, one of the nuns brought her a bottle of palatable refreshment and to complete this catalog of incongruities the best deep-dish pizza she'd had this side of Chicago Alice lost in Wonderland could not have thought it curiouser

"There may have been an error the man with the waxed mustache conceded after several hours of interrogation She was relieved to discover he had no desire to pass as an abbess despite the garb of the garrison His office —if such it was —was sparsely furnished its only remarkable artifact a human skull with its bottom jaw missing which sat on the desk and peered vacuously at her He himself was better

dressed his bowtie immaculately tied his trousers holding a lethal crease. Beneath his calculated English Vanessa thought she sniffed the hint of an accent. French? German? It was only when he produced some chocolate from his desk that she decided he was Swiss. His name, he claimed, was Mr Klein.

'An error?' she said. 'You're damn right there's been an error.'

'We've located your car. We have also checked with your hotel. So far your story has been verified.'

'I'm not a liar,' she said. She was well past the point of courtesy with Mr Klein, despite his bribes with the confectionery. By now it must be late at night, she guessed, though as she wore no watch and the bald little room, which was in the bowels of one of the buildings, had no windows it was difficult to be sure. 'I'm glad you're satisfied,' she said. 'Now will you let me get back to my hotel? I'm tired.'

Klein shook his head. 'No,' he said. 'I'm afraid that won't be possible.'

Vanessa stood up quickly and the violence of her movement overturned the chair. Within a second of the sound the door had opened and one of the bearded sisters appeared, pistol at the ready.

'It's all right, Stanislaus,' Mr Klein purred. 'Mrs Jape hasn't slit my throat.'

Sister Stanislaus withdrew and closed the door behind him.

'Why?' said Vanessa, her anger distracted by the appearance of the guard. 'Why what?' Mr Klein asked.

'The nuns.'

Klein sighed heavily. 'In my own opinion much of this is redundant, Mrs Jape, and you have my *personal* assurance that I will see you released as rapidly as is humanly possible. Meanwhile I beg your indulgence. Think of it as a game.' His face soured slightly. 'They like games.'

'Who do?'

Klein frowned. 'Never mind,' he said. 'The less you know the less we'll have to make you forget.'

Vanessa gave the skull a beady eye. 'None of this makes any sense,' she said.

'Nor should it,' Mr Klein replied. 'You made a regrettable error in coming here, Mrs Jape. And indeed, we made an error letting you in. Normally, our defenses are stricter than you found them. But you caught us off guard.'

'Look,' said Vanessa. 'I don't know what's going on here. I don't *want* to know. All I want is to be allowed to go back to my hotel and finish my holiday in peace.' Judging by the expression on her interrogator's face, her appeal was not proving persuasive. 'Is that so much to ask?' she said. '*I haven't done anything. I haven't seen anything. What's the problem?*'

Mr Klein stood up.

'The problem,' he repeated quietly to himself. 'Now there's a question.' He didn't attempt to answer, however. Merely called, 'Stanislaus?'

The door opened and the nun was there.

'Return Mrs Jape to her room, will you?'

'I'll protest to my embassy,' she said, her resentment flaring. 'I have rights.'

'Please,' said Mr Klein, looking pained. 'Shouting will help none of us.'

The nun took hold of Vanessa's arm. She felt the proximity of his pistol.

'Shall we go?' he asked politely.

'Do I have a choice?' she replied.

'No.'

The trick of good farce, she had once been informed by her brother-in-law a sometime actor, was that it be played with deadly seriousness. There should be no sly winks to the gallery signaling the farceur's comic intentions, no business that was so outrageous it would undermine the reality of the piece. By these stringent standards she was surrounded by a cast of experts, all living—habits, wimples and spying Madonnas notwithstanding—to perform as though this ridiculous situation was in no way out of the ordinary. Try as

'Just about dawn she was awakened by a light tapping on her door. The small window in it opened, a face of an old man—with a fungal beard and wild eyes—pressed to it.'

she might, she could not call their bluff, not break their po-faces, not win a single sign of self-consciousness from them.

She slept when she pleased, on her way by half the contents of a bottle of whiskey that some thoughtful person had left in her little room when she returned to it. About dawn she was awakened by a tapping on her door. Her head felt swollen and her tongue like a suede glove. It took her a moment to orient herself, during which time the rapping was repeated and the small window in the door opened from the other side. An urgent face was pressed to it, that of an old man, with a fungal beard and wild eyes.

Mrs Jape, he hissed. '*Mrs Jape.* May we have words?'

She crossed to the door and looked through the window. The old man's breath was two parts stale ouzo to one of fresh air. It kept her from pressing too close to the window, though he beckoned her.

'Who are you?' Vanessa asked, not simply out of abstract curiosity but because the features, sunburned and leathery, reminded her of somebody.

The man gave her a fluttering look. 'An admirer,' he said.

'Do I know you?'

He shook his head. 'You're much too young,' he said. 'But I know *you*. I watched you come in. I wanted to warn you, but I didn't have time.'

'Are you a prisoner here too?'

'In a manner of speaking. Tell me, did you see Floyd?'

'Who?'

'He escaped. The day before yesterday,' he said.

'Oh,' Vanessa said, beginning to thread these dropped pearls together. 'Floyd was the man they were chasing?'

'Yes. He slipped out, you see. They went after him and left the gate open. The security is *shocking*,' these days,' he sounded genuinely outraged by the situation, 'not that I'm not pleased you're here.' There was some desperation in his eyes, she thought, some sorrow he fought to keep submerged. 'We heard shots,' he said. 'They didn't get him, did they?'

'Not that I saw,' Vanessa replied. 'I went to look. But there was no sign—'

'Ha!' said the old man, brightening. 'Maybe he did get away, then.'

It had already occurred to Vanessa that this conversation might be a trap, that the old man was her captors' dupe and this was just another way to squeeze information from her. But her instincts instructed her otherwise. He looked at her with such affection, and his face, which was that of a clown, seemed incapable of forged feelings. For better or worse, she *trusted* him. She had little choice.

'Help me get out. I have to get out.'

He looked crestfallen. 'So soon?' he said. 'You only just arrived.'

'I'm not a *thief*. I don't like being locked up.'

He nodded. 'Of course you don't,' he replied, silently admonishing himself for his selfishness. 'I'm sorry. It's just that a beautiful woman—' He stopped himself, then began again on a fresh track. 'I never had much of a way with words.'

'Are you *sure* I don't know you from somewhere?' Vanessa inquired. 'Your face is somehow familiar.'

'Really?' he said. 'That's very nice. We all think we're forgotten here, you see.'

'All?'

'We were snatched away such a long time ago. Many of us were only beginning our researches. That's why Floyd made a run for it. He wanted to do a few months' decent work before the end. I feel the same sometimes.' His melancholy train halted and he returned to her question. 'My name is Harvey Gomm. Professor Harvey Gomm. Though these days I forget what I was professor *of*.'

Gomm. It was a singular name and it rang bells, but she could at present find no tune in the chimes.

'You *don't* remember, do you?' he said, looking straight into her eyes.

She wished she could die, but that might alienate the man—the only voice of sanity she'd found here—more than the truth.

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Life in the ultimate microcosm: the world's jungles, savannas, oceans, and deserts under one roof

BIOSHELTERS

BY DORION SAGAN

If we travel to the stars or have to inhabit an Earth devastated by nuclear war we may live out our lives in a structure like Biosphere II, a self-supporting sealed world soon to be constructed on an isolated patch of Arizona desert. One of the most daring and imaginative environmental projects now under way, Biosphere II will be, in effect, a microcosm of Earth (Biosphere I) complete with its own miniature rivers, grasslands, forests, deserts, ocean, and human population.

As it is now conceived Biosphere II will be a massive complex of five interconnected structures called *biomes*. The *human habitation biome* is a four-story white domed building that will include apartments, laboratories, offices, workshops, a library, and computer and communications facilities. South of that is a glass-sheathed *intensive agriculture biome*, where crops will be grown. The tallest structure in the complex is the *rain forest biome*, which will enclose a small mountain, a rain forest, and a waterfall that sends a stream flowing through a *transition biome*. This structure will include a miniature tropical savanna, a freshwater marsh, a saltwater marsh, and a miniocean, complete with a coral reef and a wave machine. Farthest south in the glass-and-metal microcosm is the *desert biome*, a desert environment duplicated in miniature.

In addition to the flora and fauna, say the project's developers, there will be eight human volunteers who, sometime in 1989, will let the Biosphere II air lock seal them in the two-acre ecosystem for two years. It will be their job to test the feasibility of living in and operating a totally self-sustaining manned station such as might be erected on Mars or beyond.

Like the nineteenth-century writer Henry David Thoreau, who lived out his philosophy of self-reliance at Walden Pond, the eight Biospherians will be part of the ecology of the biosphere. They will depend on renewable food and energy sources, the

PHOTOGRAPHS BY PETER MENZEL

At left, test module building, where various Biosphere II ideas are first tried out

'Its builders see in Biosphere II more than just a habitat for the space program. They want it to serve as a kind of control world.'

animals they raise, selected plants, and the management of their own recycled wastes. Fish farms will provide many of their protein needs, and they will depend on benign technologies, such as using ladybugs for pest control, to maintain ecological harmony.

They will know that any carelessness on their part could poison their biosphere and, ultimately, themselves. There will be no physical contact with the outside world, although Biosphereans will have access to it through telephone, television, radio, and computer networks.

The money for this futuristic venture—estimated at $30 million—is being provided primarily by Edward P. Bass, son of a Texas oil baron and chairman of Decisions Teams, Ltd., and Space Biospheres Ventures, the formal name for the Biosphere program. Under Bass, Decisions Teams, Ltd., will be a for-profit undertaking, with funding to continue over a seven-year period.

The project will be developed and run by the Institute of Ecotechnics, a London-based international ecological development firm. A contract

Hydroponic gardens and fish farms (above and right) will feed the Biosphereans

"Biosphere II could be deliberately manipulated to simulate environmental problems that might someday afflict Earth"

for the design of Biosphere II has been given to Sarbid Ltd., a British architectural firm. The Arizona site is especially attractive because it is so near the experts and resources of the Environmental Research Laboratory of the University of Arizona, which has years of experience in greenhouse and alternative agriculture. Also participating are the New York Botanical Garden Institute of Economic Botany and the Marine Systems Laboratory of the Smithsonian Institution.

Although construction of the Biosphere II biomes has not yet begun, associated structures have already been completed. Currently in operation is a greenhouse aquaculture tissue culture complex that shelters preparatory research facilities for Biosphere II. It includes facilities where various kinds of greenhouse agriculture techniques—such as hydroponics (growing plants in liquid nutrients) and aeroponics (growing them in nutrient-saturated mists)—and aquaculture designs are being tested.

Researchers have successfully grown small crops of cucumbers, tomatoes, lettuce, eggplant, okra, papaya, bananas, corn, green beans, broccoli, cauliflower and different herbs in the greenhouse section of the complex. They have also designed a nursery where plantlets and seedlings for future crops grow amid a fog of nurturing mist, which is pulsed into the air at regular intervals.

The aquaculture bay of the facility uses an ingenious synergy of plants, algae, bacteria and sunlight in its 45 tank fish farm. As the fish eat the plants and algae, they release ammonia in the form of excrement into the water. The water is routed to a biofilter where bacteria extract the ammonia and convert it to nitrates. In turn, the nitrates are recirculated as nutrients for the water plants and algae. The system not only maintains itself but also produces a bumper crop of plants and fish which Biospherians can harvest according to their needs.

Should the unthinkable happen and a plague wipe out all of Biosphere II's crops, there's an ingenious back-up system: a tissue culture bank where plantlets will be stored. With it, Biosphereans would be able to revive a damaged ecosystem.

Also finished is an 18,000-cubic foot test module of Biosphere II, it was erected to test the structural materials, the glazing techniques, the louvers, the heating, cooling systems and the computer systems designed for the complex.

Although only a fraction of the finished size of Biosphere II, the module is already the largest existing sealed structure that admits light. As Phillip Hawes, co-architect of Biosphere II and onetime student of Frank Lloyd Wright, points out: "Simply to be able to seal up something that big represents a huge advance."

It will also use a model of Biosphere II's "lung," a special structure that will be able to expand or contract in reaction to shifts in the atmospheric pressure inside the enormous structure. Its job will be to compensate for the special stresses that come with atmospheric shifts inside and outside the sealed building. Without it, the glass skin of the building could crack.

This is not the first attempt at building a living module for space. The Soviets have been making similar albeit somewhat less sophisticated efforts. Russian cosmonauts lived for three months inside their Siberian Bios-3 during a hypothetical flight to Mars.

While Biosphere II as an idea has tremendous support in the science and space communities, it also has its share of detractors. Dr. James Bredt, chief of biological systems research for NASA, has expressed doubt that a similar structure could exist on other planets purely from the logistical point of getting enough material there. From a biological perspective, he doubts that it is sophisticated enough to be totally self-supporting. The Biosphereans—or those on the outside—may have to make periodic corrections to keep its ecology intact.

But its builders see in Biosphere II more than a habitat for the space program. They want it to serve as a sort of "control world" in which environmental and ecological processes can be closely observed.

As a living parable for us all, Biosphere II could be deliberately manipulated to simulate environmental problems that might someday afflict the earth. For example, Carl Hodges, director of the Environmental Research Laboratory in Tucson, Arizona, suggests that by closing the louvers or windows of Biosphere II and shutting out all light, one could simulate the most extreme effects of a nuclear winter (namely, atmospheric darkening caused by vast clouds of soot and dust). Hodges also says that by raising the carbon dioxide level, one could simulate the greenhouse effect, a current global warming trend that could, at its present rate, melt the polar ice caps and raise the sea level, putting the city of New York underwater by the year 2040.

Whatever the uses, science has much to gain from the project. Physicist and former astronaut Joseph Allen has gone so far as to suggest that the science of comparing biospheres may eventually become as important to our understanding of the biological world as modern quantum mechanics is to an understanding of the physical world. Creating a viable self-contained biosphere, he says, amounts to the creation of a biological atom, one with the potential to launch a whole new field of study: comparative biospherics. ∞

Opposite and top: Ladybugs will be used for safe and natural pest control.

BEYOND THE CHALLENGER ERA

BY RICHARD WOLKOMIR

A proposed space program from the people who know the astronauts

PAINTING BY ATTILA HEJJA

Like a cobra charmed from its basket the shuttle's robot arm undulates over the gaping cargo bay. The astronaut at the flight deck's console moves a lever and the arm snakes up cautiously toward a shiny cylinder floating overhead.

The operation looks good. But this is not the real shuttle. A full-scale training replica this vehicle sits in Building 9A at NASA's Johnson Space Flight Center, south of Houston. And the levitating cylinder is a helium-filled balloon.

Only the astronaut manning the controls is real. And he's frustrated because in 1987 this is all that America's manned space program does make believe.

"A lot of guys would leap into the shuttle right now if it were sitting on the pad," says astronaut Dave Griggs. A dark, intense man, he regards his visitor with a no-bunk look: you-square-in-the-eye stare. Runner lean, the forty-eight-year-old Griggs could pass for thirty-six and exemplifies the latest generation of astronauts. A Navy test pilot, this Annapolis graduate piloted A-4s in Southeast Asia, earning the Distinguished Flying Cross and 19 other medals.

Griggs became an astronaut in 1978 and during an April 1985 shuttle flight, performed history's first unscheduled EVA (extravehicular activity—a spacewalk). He was to pilot his second shuttle flight in 1986. But astronauts flew only twice that year, on January 6 in the *Columbia* and in the *Challenger*'s 73-second flight on January 28.

When the *Challenger* exploded in a cloud of smoke and debris, America's space program flared out with it. Ever since, Griggs and his approximately 80 fellow astronauts have been in limbo, continuing to train and wait for the next flight.

The *Challenger* disaster demonstrated that NASA was not the can-do superagency it seemed. Inleaked memos and off-the-record interviews, astronauts went public with complaints that had been simmering long before the *Challenger* disintegrated. Astronauts charged that NASA management had been sacrificing crew safety to maintain a crowded launch schedule. Some said the crew-selection process—left entirely in the hands of George W. S. Abbey, the director of flight crew operations—was biased and destroyed morale, particularly of the scientist astronauts. "Morale is poor," in the space station program, one briefing paper from a group of astronauts and NASA engineers asserted. Astronauts complained that NASA's space station was too ambitious for them to build and maintain with the existing shuttle fleet.

But now, "our voices are being heard," says Griggs. Astronauts are being given larger administrative roles to play in the space program. In February of last year, Admiral Richard H. Truly, a former astronaut, was appointed associate administrator for spaceflight, heading the space shuttle program. And those still active in the astronaut corps have been moved into important administrative positions. As deputy director for operations, Robert L. Crippen will be among those deciding whether to launch the next shuttle. Fred Gregory is the chief of a newly created safety branch within NASA; astronaut Bryan O'Connor is chairman of the Safety Task Force; Sally Ride has been appointed special assistant for planning; and Paul Weitz, acting deputy director of the Johnson Space Center.

The astronauts still have concerns. Chief among them: "No clear vision guides the space program. 'Back in the Apollo days it was quite clear that what we wanted was to put people on the moon, and we devoted a lot of time to doing that,' says astronaut Norm Thagard, a Marine F-4 pilot in Vietnam, an electrical engineer and an M.D. 'These days we talk in more general terms about having a space station and a transportation system that will provide routine access to space. But we don't talk about specific uses for those things.'

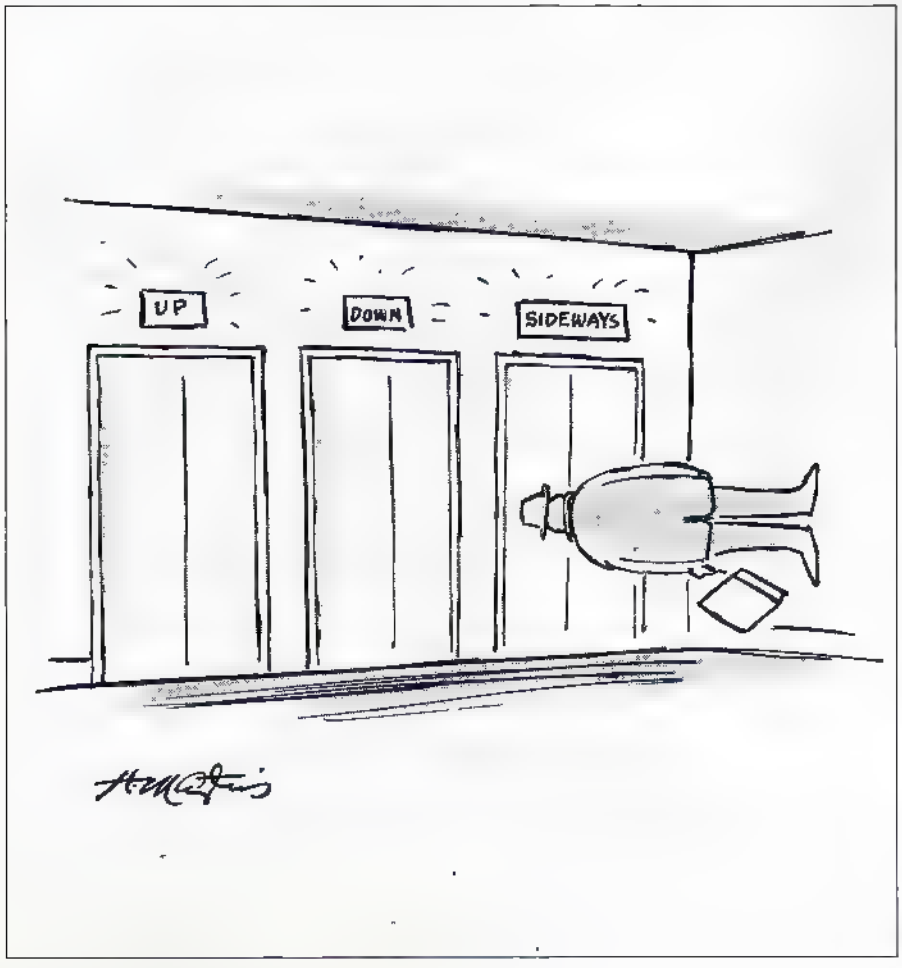
He and many other astronauts want a strong national commitment to explore space. And by that they mean deep space. Former astronaut Don Lind, for one, says we should head there in several steps. We would start with the space station and then establish a lunar colony with crews spending six months on the moon, then returning to Earth. After that, Lind would send an unmanned lander to Mars to select a site for a manned landing. He envisions a kind of robotic jeep trundling across the Martian deserts, sending back television images and digging up rock samples with a robotic arm. It would also scout out and ring sites for manned landings.

Lind has already been to near space. A 20-year member of the astronaut corps, he flew on a shuttle flight in April 1985, then left the astronaut corps to teach at Utah State University just two months before the *Challenger* accident. "My first step would be to get science back into some reasonable priority in the space program, the way it was twenty-five years ago," he says. "Look what's happened to the poor planetary program, emasculated to pay for overrun costs on the shuttle.

"I'm talking about unmanned launches at first—the X-ray telescopes, the gamma ray telescopes, and the most important next step, the Hubble [space] telescope.

"There are a few earthly problems that need to be resolved first. One of them is the dubious status of the scientist astronauts. Half the reason I left the astronaut office was that I had always intended to teach college-level physics. The other half was the crew-selection policy," says Don Lind. "I saw while I was an astronaut and was there for twenty years a great shift in what's considered a wrong direction."

Lind points out that early in the program NASA began to blend scientist astronauts with the original test pilot astronauts since space was clearly a research frontier. Many of the scientist-astronauts were also qualified jet pilots like Lind, but science was to



be their specialty on space missions.

There were people at headquarters who said, All right, these scientists need to do science, and so they encouraged them to maintain their affiliations with institutions that had cyclotrons or mass spectrometers—whatever instruments they needed—so they could keep up their scientific proficiency. It was a wise and reasonable policy, says Lind. "Unfortunately it was left to be implemented by test pilot types who didn't give a damn about science."

As a result, he charges, scientist astronauts have been less than encouraged to continue their research. In fact, they have been punished. Lind says that scientist astronauts who keep up in science are banished from the flight crew rosters. And crew selection, as Lind puts it, is "the only thing that motivates astronauts. They urgently want to fly in space or they would not have taken on a job that involves 50 to 70 hours a week of training in simulators and jet cockpits, at computer screens, and from books. All the relentless training is for the *possibility* of a few days of extraterrestrial adventure in the shuttle."

Reviewing the history of this antiscience mind set, Lind says, "Under Deke Slayton things were pretty grim. Under George Abbey they were intolerable. They shifted to an attitude that any time you're thinking about science you're neglecting your responsibility as an astronaut."

Today brilliant young scientists who join the astronaut corps sometimes can survive if they see which way the political winds blow. If they *immediately* abandon all thoughts of science and consciously put on the protective coloration of engineers, they will do rather well, says Lind.

Consequently, the best possible space program, says Lind, would start with a new mandate from headquarters requiring the astronaut office at Johnson Space Center to reestablish a reasonable scientist astronaut program. "It would mean firing George Abbey, then certainly would vote for that," he says.

Deke Slayton, who was once chief astronaut and director of flight-crew operations, dismisses such complaints. "For one thing, you've got to have a flight crew to fly the vehicle," he says. "For another, whether someone else flies or doesn't fly depends on the mission's specific requirements, which means that a lot of astronauts won't get to fly on a lot of flights, particularly payload specialists."

Meanwhile, still clouding future shuttle flights is the issue of safety. For many astronauts, it is a sore subject, but not for reasons the general public might imagine.

All the astronauts accept risks, even of annihilation, as part of the job, but they resent being kept in the dark about what the risks are. For instance, after the *Challenger* disaster, the director of the Solid Rocket Booster program at Marshall Space Flight Center in Alabama testified to the presidential commission that a failure in a primary seal in a booster rocket nozzle joint on Norm Thagard's 1985 flight was a clue that NASA should have stopped flying shuttles and fixed the problem. "Well, I never knew that until I read a presidential report," says Thagard. "That's not the way to find out."

And Lind says it was not until long after the same flight that he learned that the shuttle had come within seconds of blowing up. Again, the incident became public only when the presidential commission began investigating the *Challenger* disaster. Former astronaut Robert Overmyer spoke for many astronauts when he commented, "As long as astronauts have an *honest* assessment of the risk, they can help management evaluate it. When Chuck Yeager was flying his missions, he knew the risks. The concern with the *Challenger* was that they weren't told how big a risk they were taking because that booster was the one system they thought was one hundred percent [safe]."

It is hardly a question of astronauts being afraid to fly. "I think a lot of people would fly with that original booster right now, only they'd do it in warmer weather," says Overmyer. "By *knowing* what the risks are, at least they can decide."

"We knew a lot about the main-engine problems. We heard about them every Monday morning," Lind adds. "We knew about all the brake problems. We heard about them every Monday morning, too. But we didn't know about the O-ring problems. When I found out that we came within seconds of blowing up, I felt betrayed."

"I agree with the Queen of Hearts—off with their heads," he says. "I wanted the guys who sent us up under those risks and did not tell us about them fired."

We need an improved shuttle, but that doesn't necessarily mean an altogether new one, says Overmyer, a former shuttle pilot and now an aerospace consultant. "You could just tear out the cockpit, gut the thing, and rebuild it from the inside, replacing 1972 technologies with modern equipment. The IBM PC sitting on your office desk has more computing power than what's in the shuttle right now."

He would also like to see what he calls "more margins" built into the machine. For instance, remember that mission when we retrieved *Solar Max*? he asks. "We had a hard time snaring the satellite because we were running out of fuel. It looked like we were going to blow it," says Overmyer. "It would not be that hard to increase the complement of fuel onboard to give the crew a comfortable fuel supply margin to perform those kinds of maneuvers."

Worries about safety are not restricted to the shuttle but extend to its landing sites as well. In a memo made public last spring, chief astronaut John Young complained about how risky shuttle landings were at the Kennedy Space Center in Florida. The runways are short and narrow, and the weather can be unpredictable. Some as-

tronauts have ever said the Kennedy land ng strp st ould be lm ted to emergency landings To comp icate things th shuttle comes n as dead we ght No eng nes are operat ng so the p ot gets on y one chance G ven a choice most would prefer the wide long and ng strp on the lake beds of Edwards A r Force Base

Sure yo d ke to a ways be able to and on a ake bed Overmyer says But if you can t why not provide the shuttle with a go around capab ty so you have more than one shot at the landing? R ght now the shuttle requires test p ots to f y it because they have that extra training It s a de mand ng fly ng mach ne and d like to off oad the p ot s workload a b t

As for shuttle equ pment Overmyer th nks the manned mob ty unit the jet prope led modu e the astronauts fly outs de the shuttle would be more effect ve if t were more maneuverab e and could fly farther away from the ship L nd has his own candidate for improvement the space toi et wh ch he describes as one of the great traged es of Amer can engineer ng

In sp te of the cr t cisms no one is ready to scrap the shuttle total y Every astronaut nterviewed wants to get back into space as quickly as possible And that means stay ng with the proven des gn The shut tle is f fteen years old and the techno ogy s aging says Deke Slayton one of the original Mercury seven but the f p side is that since you re try ng to operate a fleet whatever you bu d as a rep acement for the *Challenger* wi have to be compat ble with our exist ng fac lities

The astronauts seem wi ng to go back into space in anything a Mack truck f necessary But some have questioned the w sdom of how our next step n space a permanently manned space station wi be executed As the stat on is now conceived there wi be two core structures a crew modu e for living quarters and a separate laboratory modu e These will abut a 503 foot long boom w th a g ant pair of so ar pane s attached to each end The boom wi bisect a g ant rectangu ar truss to which other modu es can be attached

Dave Gr ggs says that if he could have the space stat on he wanted and funds were no ob ect h s f rst requirement would be more room *Skylab* sent a off n 1973 was 27 feet in diameter The crew module in the 1994 space station w ll be only 13 feet in d ameter to fit ns de the shuttle cargo bay Nobody wants to l ve n a tra er when you can ve n a mansion he says You a so want some w ndows But most mportant he wou d min m ze the number of spacewa ks required to bu d the stat on

It would be prefe ab e to have as few EVAs as poss b e agrees Norm Thagard because phys ca y they re very t ring When you re ns de a space su t everything you do is hard My fee ng is that t would be d ff cu t for one person to do more than a coup e of EVAs a week

L nd and a few other astronauts have more fundamenta c t c sms about the sta tion design I think we abso utely need to build a space station he says but I th nk we re bu ld ng the wrong one First of a it has to be assembled with so many shuttle f ights Do you know how b g the whole space station s? he asks A football f e d would f t ns de the truss f you aid t down on the ground The solar pane s wou d hang out over the stad um The modu es would form two eleven story bu ldings on the fifty-yard line t s going to take years to assemble t We can t beg n like that

What we ought to do he says s to get some exper ence w th a sma er structure f rst and gradua y work our way up to the b gger version once we know what works and what doesn t

Phys cist Joseph Allen who ret red from the astronaut corps n 1985 after 18 years be eves the astronauts c t c sms of the space stat on design ref ects a deeper problem the lack of a national commitment to space What you heard from astronauts was d smay with the system he ma ntains It s not that anyone is disgrun tled with the space station It s ust that they re really saying If you won t give us the equipment to bu d it don t ask us to do the impossib e

Whatever their comp a nts or d sagreements a the astronauts share one strong feeling They *believe* n space exploration "Don t th nk I m a rebe I m not m a supporter of the space program I enjoyed being an astronaut stresses and I just want to make some changes

Currently the astronauts chief concern s fu f ng their sta ed personal dreams We re try ng to get back into the f y ng bus ness says Norm Thagard "Most folks came here for one reason only to fly n space Let s face it, f I thought I wasn t going to f y again for years and years I wouldn t stay

Some of the glamour of the days of the Mercury seven may be gone but the a ure of be ng an astronaut st ll has a powerful ho d over the space e te

"It s not mundane ke a lot of other things I might be doing exp ains Thagard It s exc t ng So exc t ng it s d ff cult to dec de what to do afterward

He eases back n his cha a lean man with intense blue eyes They do not blink The astronaut s stare

The question is he says what do you do when you grow up?

Across the Johnson Space Center cam pus three NASA technicians wander the Miss on Control room gnoring the pha lanxes of computer consoles and the wall size map of the world t n b ue Their at tent on is drawn to one video monitor One of them c cks it on and as the screen comes to l fe does some careful tuning The rest sett e nto the worn chairs and study the screen It is an odd scene They seem ob v ous to the irony Here in the control center for a manned spaceflights n the Un ted States they watch a baseba game the New York Mets playing the Houston Astros The Astros ose

THE FORCE

CONT N ED FROM PAGE 43

n their anal ys s maybe there were none

Much to F schbach s re ef Dicke ev dently liked the paper It s one of those revolutionary things that f r ght has great importance he said can t pick any holes in the analysis *Physical Review Letters* took him at h s word publishing Fisch bach s paper on January 6 1986

On January 7 the day after the *Times* story hit the stands F schbach was exhausted He had been talking to reporters from a around the wor d pat ent y d s cussing h s c aims try ng hard to be s mple and nterest ng After a long day of this he dragged h mse f home

I was stand ng around while my wife Jan e was try ng to make some dinner when the phone rang he recal s She picked up the receiver and sa d It s *The National Enquirer Oh God* I thought *how can I relate the fifth force to sex and violence?* I picked up the phone and it turns out it s my friend Bruce Winstein He says Ha ha t s only me

W nstein it happened was ca ing for a reason F schbach was scheduled to ta k at Stanford in a few days and W nste n wanted to make some plans Over whelmed by anx ety and s ck with the flu F schbach wanted more than anything to cance the tr p except that he rea zed everyone would ca l it a cop-out Be cause he couldn t renege and he couldn t stand the thought of sub ect ng h s v olent head cold to the pressures of a plane f ight, he *drove* from Washington State to Stanford "My ears hurt so much even on the gradua h lls he recal s that I could barely focus F schbach ended up giving h s talk and driving back home only to learn that h s f ve-year old M chael had fa len grave y i M chael had to be hospitalized for dehyd rat on says F schbach "There was this poor kid I held him in my arms wh le they tried to get an I V in h m I felt ango shed It was the end of the wor d"

F nal y on F day January 10 amid a barrage of phone calls and cr t cism F schbach was able to take Michael home "At last we were all together F schbach relates It was about eight thirty at night my eight-year old Jeremy was running out of the shower naked and a and the phone rang Jeremy p cked up the phone and sa d Daddy it s for you It s a Mr Feyn man " The only Feynman F schbach knew of was Richard Feynman one of the greatest phys c sts of th s century

Feynman knows me from a ho e in the ground ve never spoken to the guy never met h m It was obviously a joke So I pick up the phone and say Okay Bruce enough is enough I m really tired He says This s Richard Feynman

I say A right Bruce I get the mes sage Cut it out

He says This is Dick Feynman I m a theoret ca phys c st

"I say 'Oh come on,' but finally I listen to him. This is either the best imitation of Feynman I've heard or it's Feynman. And finally after a few of these go-rounds I realize it is Feynman."

Feynman warned him about a letter he had sent to the *Los Angeles Times* in response to their editorial on the fifth force. In the letter Feynman expressed his doubts about the fifth force, declaring that if it really existed, its effect on other physics experiments would have been undeniably evident. Feynman's conclusion was devastating. "It's unfortunate," he declared, "that a paper containing within itself its own disproof should have gotten so much publicity." As a courtesy he was calling to tell Fischbach before the letter appeared.

Going through the mail for the next few months was a harrowing experience. "I got several of these green-and-white envelopes every day from *Physical Review Letters*, mostly papers to referee," Fischbach says. "Every time I opened one there was trepidation. Was it going to be from the one guy who could prove me wrong? One by one we opened the envelopes and looked inside." Nobody ultimately found Fischbach's work incorrect, but some people found mistakes.

One word in particular would prove to be an embarrassment. Fischbach had compared the strength of the new force as determined by the Eötvös experiment with what Frank Stacey had measured in his mines. The numbers differed by a factor of 15, which Fischbach called "remarkable agreement." Feynman, along with others, did not find this at all remarkable.

More careful calculations have resolved these problems. "The resolution came from understanding what kind of matter influenced the original Eötvös experiment," Fischbach explains. "It was natural for us to think that the earth as a whole acted on the apparatus. But we now realize that the influence of the local environment—the mountains, the buildings, and the basement itself—is far more profound." Fischbach wrote to Eötvös University administrators who provided the dimensions of the building in which the work was done. Using those figures, he has reduced the discrepancy to a factor of three. "Nobody regards that as a problem," Fischbach adds, and "now when I get a letter from *Physical Review Letters* I don't feel as if it's the end of the world."

Even if Fischbach's analysis is correct, people have trouble embracing data from an 80-year-old experiment. The reasoning theorist Mike Turner from the University of Chicago explains is that you're supposed to write down everything that was done so that in five hundred years people can follow it." But this standard of care is rarely met. In Eötvös's case, things were even worse. He died before he wrote up his work, and his historic paper was actually written by his co-workers.

As a result, similar experiments are currently being performed around the world. At the Eleventh International Conference on General Relativity and Gravitation, held last summer in Stockholm, experimenters met to discuss their schemes for homing in on the fifth force. No matter *what* the experimental setup, the goal was to take more sensitive measurements than Eötvös did while eliminating environmental factors that might have distorted his results.

Physicist Riley Newman of the University of California at Irvine described his version of the Eötvös experiment. It will be very much like the original, but with modern bells and whistles: vacuum containment, magnetic shields, computers.

Jim Faller from the Joint Institute for Laboratory Astrophysics in Boulder, Colorado, took some of the earliest and sharpest jabs at Fischbach. But today he is building a miniature Tower of Pisa in his lab in order to drop objects and see if there is any difference in the rates at which they fall.

Paul Boynton's experiment at the University of Washington was also described

> *"Scientists at major laboratories all over the world have voted for Fischbach by committing both their time and their budgets to pursuing his lead."*

in an ingenious variation on Newton's pendulum. He has fashioned a small disc with each half made out of a different material. Suspended from its center by a quartz thread, the disc will twist back and forth. The experiment is being performed at the side of a mountain. If there is a fifth force, the mountain will attract the two halves of the disc unequally, and that will affect the rate at which it oscillates.

Plenty of physicists, from world famous demigods to colleagues at Purdue, first snipe at Fischbach. Just recently Robert Dicke of Princeton and Shu-yuan Chu of the University of California at Riverside published a paper stating that the discrepancy in the Eötvös data stemmed not from a fifth force but from temperature changes that created "a gentle wind in the room."

Fischbach strongly disagrees. "We took that possibility into account when we did our calculations," he says. The Eötvös experiments were conducted over a period of four years, and it's unlikely that the temperature would have had the same effect on all the test materials day in and day out through all that time.

There's not much he can say to Sheldon Glashow, however, who acts as if Fischbach were a used-car salesman pulling the wool over physicists' eyes. Glashow summarizes the arguments for a fifth force based on kaon data. Stacey's mine experiment and the reanalysis of the Eötvös experiment—this way Fischbach and his friends offer a silk purse made of three sow's ears and "not buy it."

Only experiments will settle the issue of whether a fifth force exists, and these are being done. Despite the likes of Glashow, scientists at major laboratories all over the world have voted for Fischbach—not by making statements to the press but by committing their time and their budgets to pursuing his lead.

At the University of Washington in Seattle, Eric Adelberger and his colleagues have built an Eötvös-type experiment. "Fischbach raised an interesting point that has an experimental answer," he says. "It needs greater exploration."

Brookhaven's Peter Thieberger, who has been working on a project that in principle is related to the Eötvös experiment, says there is strong evidence for a force related to hypercharge. Will it be powerful enough to resist its critics? Can Fischbach and his team possibly be correct? Says Thieberger cautiously, "Maybe."

Val Fitch, a Nobel prize winner from Princeton, has recently joined the search for the fifth force. Says Fitch, "Fischbach showed that there was a whole new window to look [at the universe] through."

Frank Stacey agrees. "What Ephraim has done is damn clever," he says. To explain the criticism that Fischbach has received, Stacey invokes the story of the lion and the hyenas. The lion, on hearing explanations, makes the kill. Then the laughing hyenas feed off the carcass.

Whether Fischbach's catch proves ultimately nourishing will remain unknown for months or even years. Meanwhile, he is once more sleeping soundly at night. By day he wonders what a universe with five forces would look like. With Aronson he is planning a kaon experiment that would unambiguously show the effects of a fifth force. "We'd like to be able to predict," he says, "just what the force can make kaons do." He fills notebooks with admittedly far-out plans for how a fifth force might some day be controlled.

"We're where we were with electromagnetism in the middle 1800s," Fischbach says. "Though electromagnetism is now the cornerstone of all modern technology, from cars and rockets to telecommunications and lasers, we couldn't have fathomed these things a hundred years ago. It's too soon to say what the new force will bring, but if it can be controlled, it will be used."

Fischbach also stays in constant touch with all the experimenters pursuing his lead. Any day now, he says, he might get the phone call telling him Galileo was wrong and the fifth force is real. Maybe he'll even hear it on the evening news. ∞

In a rare conversation the famed Swiss psychoanalyst and controversial writer offers a means to banish child abuse, terrorism, and violence from the human race

INTERVIEW

ALICE MILLER

I describe pictures of people, use histories of them as mirrors. And then many come and say, 'This is exactly what I felt all my life but couldn't say.' I don't want to be a guru. I don't want people to believe me. I only encourage them to take their own experience seriously.' Alice Miller's stories portray abused and silenced children who later become destructive to themselves and to others. Adolf Hitler, says Miller, was such a child. Constantly mistreated by his father, emotionally abandoned by his mother, he learned only cruelty; he learned to be obedient and to accept daily punishments with unquestioning compliance. After years, he took revenge. As an adult he once said, 'It gives us a very special, secret pleasure to see how unaware people are of what is really happening to them."

Miller, famed throughout Europe, wrote of Hitler's childhood in *For Your Own Good: Hidden Cruelty in Child-Rearing and the Roots of Violence*. In the same work she lets Christiane F. tell her own story: "I had trouble telling the letters *H* and *K* apart. One

PHOTOGRAPH BY JULIA MILLER

even ng my mother was taking great pains to exp a n the d fference to me I could scarcely pay attention to what she was saying because I not ced my father gett ng more and more fur ous I always knew what was going to happen He went out and got the hand broom and gave me a trouncing Now I was supposed to te the difference between *H* and *K* Of course by that time I d dn t know anything anymore so I got an other licking and was sent to bed ' Chr st ane went nto the street and became a drug addict

'We do not need books about psychol ogy in order to learn to respect our ch l dren, M ler says 'What we need s a total revision of the methods of child rearing and our trad t onal view about it '

The way we were treated as sma l ch l dren s the way we treat ourse ves the rest of our ves w th cruelty or w th tenderness and protection We often impose our most agon z ng suffering upon ourse ves and later, on our children

n 1979 M ler's first book *The Drama of the Gifted Child* was published n Ger many F rst t t ed *Prisoners of Childhood*, its three short essays described how par ents project their fee ngs deas and dreams upon their ch ldren To survive and be oved a ch ld learns to obey In repress ng h s or her fee ngs the child st fles at tempts to be nerse f or himself The resu t, sa d M ler, s all too often depression, ebb ng of vita ty the oss of se f *The Drama* drew wide audiences n Europe and then the United States Two more books quickly followed *For Your Own Good* and *Thou Shalt Not Be Aware* cont nued to focus on the ch ld but moved nto deeper studies of ch d abuse att tudes of child rearing, psy chological theory and treatment

Last summer M ler published *Pictures of a Childhood* A collection of 66 water color pa nt ngs, it represents a sma fraction of her art As she te s us in the book's ntroduction M ler started to pa nt 14 years ago Five years after I began pa nt ng spontaneously, I started writ ng books This never would have been possible without the inner liberat on pa nt ng has given me The more freedom I got p ay ng with colors, the more I had to quest on what I had learned twenty years ago

"It wasn't until I wrote my books that I found out just how host le society was to ward ch ldren " she says "I have come to rea ze that hostility toward ch ldren s to be found n count ess forms, not on y in death camps but throughout all levels of society and in every nte ectua d sc pline even in most schools of therapy '

Born n Po and in 1923, M er was edu cated and l ves n Switzerland She stud ed ph losophy, sociology, and psychology and took her doctorate n 1953 She com pleted her psychoanalyt c tra n ng n Zu rich and as a pract c ng psychoanalyst she has been nvo ved in teach ng and train ng for more than 20 years

As her writing progressed M ller s view of the child became more and more op posed to that of traditional Freudian theory M ler at f rst ded cated *Thou Shalt Not Be Aware* to Freud on the one hundred twenty fifth anniversary of h s b rth ' H s d scov eries of the surv va of ch ldhood exper ences n the adult unconscious and the phenomena of repression have influenced my fe and way of thinking " she says But I came to d fferent conc us ons than Freud when could no longer deny what learned from my patients about the repress on of child abuse."

Today M ler has departed from the tra d t onal analytic approach to treatment and from Freudian theory Early in h s work Freud bel eved that the root of neurosis was actua trauma, often v o ent and sexual in nature that had been repressed in child hood Later he altered h s v ew, deciding that the ch ld s by no means nnocent but is born with drives that are sexual and de structive in nature Why has Freud's Oed pus complex asted so long? M er asks 'Because n the Freud an view the parents,

"To be skillful, admired, famous, and then to abandon all this to go your own way is very frightening to most people. But I had to do this in order to become free."

not the ch ld are nnocent The Freud an view f ts society t overlooks in Oed pus the abused ch ld and sees him w th nces tuous wishes that lead to his k ll ng h s fa ther marrying his mother, and ultimately b nd ng himself

Traditional analysis says M ller, dup cates the parent child relat onsh p with the conv ent onal analyst n the pos t on of power But there s hope in therapy f the therap st is a true advocate of the patient. Respect for the ch ld w th n the patient and h s d scovery of his rea history must play a ro e n the treatment process The child undergoes a long nner struggle 'between the fear of os ng the person he oves f he remains true to himself and panic at the prospect of los ng himself f he has to deny who he s A ch ld cannot resolve a conflict of this nature and s forced to conform be cause he cannot surv ve by h mself Ther apy shou d not repeat th s cond t on '

M ler uses the phrase *poisonous peda gogy* to descr be what we nf ct on ch l dren for the r own good out of our hypoc r sy and ignorance She perce ves that we nstill hum at on shame, fear and gu t as we are 'train ng children By encourag ng conformity, suppressing cur os ty and emot ons a parent reduces a ch d's ab ty to make crucial percept ons n later fe 'Ch dren are to erant They learn nto er ance from us

Wh e M er s work is gnored or at tacked by the orthodoxy, far sighted ther apists often ha it as monumental n ts analysis of hidden cruelty and the roots of violence Anthropologist Ash ey Montagu stated that *Thou Shalt Not Be Aware* w undoubtedly prove to be a watershed n the h story of psychoanalysis

'My ant pedagog ca pos t on is not d rected against a spec f c type of peda gogy, ' M ller notes ' but against pedagog cal deology n genera , wh ch can be found also n the permissive theories ' She fears that as a consequence of adults' ar rogant attitudes nc ud ng 'permissive attitudes toward ch ldren's fee ngs, chi dren are tra ned to be accommodat ng But the r own voices w be s enced and the r awareness k ed And more blind and ar rogant adults w be the result

Interviewer D ane Connors a so a psy chotherapist v sited M ller in her apart ment near Zur ch Sma n stature M er rad ates a sense of both caut on and fragi ty, and a clear eyed, unf nch ng comm t ment to what she is say ng, and an awareness of soc ety's resistance to her work

Omni: When d d you real ze respect for the child would be your centra focus?

Miller: I looked from the beg nn ng, th nk from my ch dhood for the answer to why people behave in such an irrat ona way I a ways needed to understand and make th ngs clear d dn't get much nformation from my mother, who wou d say ' t s this way t s so and so and so ' She never gave me an exp anation if asked I was very alone as a ch d

Maybe was five years old when I saw a woman w th a ch d The girl was three or four She fell down and was hurt Her mother who was ta k ng to another mother slapped the child just because she came cry ng w th b oody knees remember my quest on then "Th s ch d is pun shed twice first by fa ng down and then by the mother Why does she pun sh the ch d? She s not gu ty—she needs her mother s he p not punishment "

Omni: Did you ask your mother?

Miller: I did not dare ask this quest on but it was the 'preq est on" of my fe Then I saw the war, and I asked why peop e hate so much and behave in this absurd way They must have a h dden reason I guessed I found no answer n ph osophy and none in psychoana ys s I found t n the later years of my life when faced the child w th n myself and when I began to listen to the child n my pat ents

I had to forget the theories Even Freud says that the ch d is gu ty f he is hurt The ch d s a ways gu ty The mother of my childhood memory was angry that the child was a prob em when she wanted to ta k to a fr end could see that because was five

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ST 1

and didn't know any theories at that time. Grown-ups don't see. They learn theories that cover up the most obvious explanations and they believe these theories.

You know Andersen's tale "The Emperor's New Clothes"? I think it is my role in society now and in analytic society to say the emperor is without clothes. And many now say "Oh, I am so glad because I knew it too but didn't dare say it." Yet there are others who say he is wearing clothes because they are afraid of losing power.

In *The Drama* I'd hoped to reach the professionals, my colleagues, so I spoke in psychoanalytical language. Meanwhile, I went beyond this language and I don't use it anymore. I no longer try to reach people trained as I was. Even as they deny what I wrote, their patients say, "She describes my own experiences. I know what she is talking about."

Omni Why do some professionals deny what you're saying?

Miller Because they are not allowed to face reality. You know, it was interesting. The first time I talked on these ideas was when I spoke to about three hundred analysts on the narcissism of psychoanalysts. They were so surprised, because it was very unusual to hear a colleague's side with the child. First they reacted naturally, were just grateful, and did not show much resistance to their feelings. They thanked me and said, "But how did you know it was my life you described?" And I said, "It was my own life I described." Many men had tears in their eyes. Then I tried to publish this article in a German professional review, but the editors refused it. Resistance was already established. They sent it back because they had to see everything as Freud would have otherwise it is frightening or dangerous. The International Analytic Society published it in the *International Journal of Psychoanalysis*. But the German review *Psyche* did not. It was too provoking for the Germans.

Omni What were the provocative issues?

Miller That neurosis and psychosis result from repressed feelings that are a reaction to trauma. The child's anger and all the other feelings we don't like are reactions to child abuse.

Today we know that we have a lot of child abuse. It was silenced before. The child must repress the memory of this abuse and deny the pain in order to survive, otherwise he would be killed by the pain.

Omni Might this happen so early in the child's development that he lacks words, understanding, or permission to express the pain?

Miller The words have to be found. A good therapy should help the patient evolve from a silent child to a "talking child." The child couldn't have found the words if the trauma were too early, or the environment too hostile. But now, in therapy, if you have a therapist who is really your advocate, your conscious witness for when you experienced your trauma for the first time, then you become a talking child. Therapy exists to help you find the words to tell your mother or father how you felt at that time when they hurt you or how you felt when you could not talk—even that.

Omni What do you mean by *advocate*?

Miller One who sides with the child. Always. The therapist must not say the parents were disturbed but well-meaning because he is then siding with the grown-ups. If the child thinks that the parents who behaved so strangely and humiliated him were well-meaning, he cannot feel *his* pain and he sympathizes instead with his parents. It is a crime to beat a child because the beating is a damage, and you can never change this reality. A battered child feels humiliated, confused, isolated, and he is made to feel guilty because he is told he is bad. We are afraid to say that child abuse is a crime because we want to protect the parent from his guilt. But we really fail to help them when we support their blindness, because in this way we also betray the child in the parent.

Omni How do you deal with pain in the healing process?

Miller Pain is the way to the truth. By denying that you were unloved as a child, you spare yourself some pain, but you are not with your own truth. And throughout your whole life you'll try to *earn* love. In therapy, avoiding pain causes blockage. Yet nobody can confront being neglected or hated without feeling guilty. "It is my fault that my mother is cruel," he thinks. "I made my mother furious, what can I do to make her loving?" So he will continue trying to make her love him. The guilt is really protection against the terrible realization that you are fated to have a mother who cannot love. This is much more painful than to think, "Oh, she is a good mother, it's only me who's bad." Because then you can try to do something to get love. But it's not true: you cannot earn love. And feeling guilty for what has been done to you only supports your blindness and your neurosis.

There are some treatments where the patients cry a lot—they really suffer—but do not talk. I saw a videocassette where for one hour the patient relived the pain of birth but didn't talk about it. Only later did he report on what he had felt. But in my opinion it is important to speak, to verbalize, during the experience of pain. Even if the patient felt as if he were in the womb, he should try to talk to the mother and tell her how he feels. The link between feelings and their verbal expression is crucial to the healing process. But he can't do it without assistance; he has to know someone is there who understands how he feels, who supports and confirms him. If a child has been molested and the therapist doesn't deny this fact, many things can open up in the patient. The therapist must not preach forgiveness, or the patient will repress the pain. He won't change, and the repressed rage will look for a scapegoat.

Omni Do you think the child has no history, that a child is born into the world like a ta-

bula rasa on which experience inscribes his or her character?

Miller. No, I don't. The child comes from the womb with his or her history as experienced in the womb. But he doesn't come with projections. He's born innocent and ready to love. And the child can love—much more than we grown-ups can. This idea of the child as a loving being meets so much resistance because we learned to defend our parents and to blame ourselves for everything they have done.

Omni: In what ways does your style reflect these views?

Miller. I try to reach the child in the readers, allow them to feel. I see my style as ranking keys. Everybody can take one so that they can go open their own door to find something. Or they can say no, I don't want to go through this door, will return the key. I try to evoke feelings, images. In this way I offer keys to your own experience. You can then go look at your children and learn from them, not from me. Because only from your own experience can you really learn.

In my first studies I was very abstract. I wanted to understand the most abstract ideas—of Kant, Hegel, or Marx. My dissertation in philosophy was very abstract. Now I see that each philosopher had to build a big, big building in order not to feel his pain. Even Freud.

Omni: Why did you decide to become an author and lecturer?

Miller: I want to inform people that there is no one person in the whole world who abuses children without having been abused as a child. I think this finding is crucial and can help to understand a lot of things. As an analyst, I couldn't share my findings with anybody of this profession. It wasn't possible, and I had to understand why not. So I wrote my third book, *Thou Shalt Not Be Aware*. Again I was in the position of the child who sees so many people admiring the emperor without clothes. I wanted to understand this too, their motive. Why are they not aware?

Then others began showing interest in my work. Ashley Montagu confirmed my view of the child, and I also found confirmation from other writers who wrote about child abuse. Montagu sent me his book *Growing Young*, in which he quoted the famous British psychoanalyst Edward Glover. Glover describes the perfectly normal infant as "egocentric, greedy, dirty, violent in temper, destructive in habit, profoundly sexual in purpose, aggrandizing in attitude, devoid of all but the most primitive reality sense, without conscience of a moral feeling, whose attitude to society as represented by the family is opportunist, inconsiderate, domineering, and sadistic." So when we compare the normal baby to the criminal type labeled psychopath, the baby for all practical purposes is a born criminal. This view is dangerous to humanity. We pretend to give the child the norms of society to make him into a human being." This is the Freudian view of the infant. Melanie Klein also saw the infant as a destructive creature. I once talked to a Kleinian analyst, a nice young woman, and she said, "Haven't you seen destructive babies?" And I said, "What do you mean?" She said, "Small things that give you a slap." And I said, "Why are you so appalled by this play? The baby doesn't understand. But if you believe it is wrong and bad, he will feel wrong and bad, will not understand, and will finally become destructive out of this distress." I think our attitude toward infants will make them either good, loving, and trusting or hating and destructive.

Omni: Do you have reactions from Kleinian analysts to your works?

Miller: A Dutch psychiatrist trained in the Kleinian school once wrote me, "What you have written seemed terrible at first and turned around everything I had learned, and it scared me. But now I am grateful. Every day at the hospital is fascinating. Each patient is a history, and I learn from each of them."

When I say I'd like to open my eyes and ears to the suffering of the child, it's close to what [Frederick] Leboyer did with the newborn. So many people have witnessed birth, yet nobody saw the child was suffering, crying out in psychic pain. Nobody could feel with the child. They were convinced it was necessary to cry after birth. Leboyer said that this pain was unnecessary. "I can show that the child will smile some minutes after birth," he said. Many mothers know he was right, but not the professionals, who still prevent mothers from making birth a good experience for their newborns. They learned thirty years ago that it is necessary for the baby to scream and be spanked, and they continue to believe what they learned.

> *"As a child, Hitler had no witness. His father destroyed everything he did. He could never tell anyone the pain he was suffering. He was treated like a dog."*

It is the same for my work. To protect what they learned, the professionals ignore what I'm showing them. What Leboyer did for the newborn, I'm trying to do for the older child: to explain his behavior, to bring adults closer to his suffering, which they deny, to explain how he feels and in this way prevent child abuse in the future. As long as we deny the child abuse, we can't stop it. We just call it upbringing. I am trying to listen to the child's voice, make people aware of the child's feelings, feelings that I first faced in myself when I started to paint.

Omni. Do you think painting opened up a lot of feelings for you?

Miller. Because I could begin without theoretical knowledge, without luggage, really as a child. And I had so much fun when I began. I knew something was going to be created, to come out. And it did. The first five years of painting enabled me to write *The Drama* in this unconventional way. I was playing with thoughts. And as I experienced creativity in my painting, became much more critical about what I had learned as theory.

Omni. In *The Drama* you connect repressed feeling with loss of vitality. Was that your experience here?

Miller: Yes, experiencing the pain of my life gave me back my vitality. First pain, then vitality. The price of repressing feelings is depression. I also had to resist the usual way of learning: if you are forced to do something, you cannot have fun. But for me, having fun is the first condition of creativity. I learned when I played with color. But I resisted learning about color by reading theories from books. For me, painting, dreaming, and writing have something in common. I paint as I dream. I have many impulses and associations. I never have a plan, a concept of what I want to do. I do have a concept sometimes, but I cannot realize it because while painting I start to dream of something else and I forget my plan. In the beginning I had a sort of narrative style. I wanted to tell a story, or a story in myself wanted to be told. Now it's more like needing this color, this form, this line. It's improvisation. I'd say I am painting like a jazz musician.

I don't want to make a masterpiece, or even good pictures. Fortunately I don't need to sell my paintings. I'm only compelled to work further and further into what is true. Sometimes I destroy my paintings. I change and change them, even though they may have been better before. In the end I'm happy because it's what I wanted to say. I don't care if someone says it's good or not. In painting I feel absolutely free. I have my palette, my white paper, and nobody can tell me what is right or wrong.

Omni: You admire Goya and Turner?

Miller: They are not models for me but are examples of true and great artists. Both were successful and admired. Then suddenly they absolutely changed their styles. Goya, who had made wonderful portraits, began painting ghosts and his inner world. And Turner began painting light. And when people began to say, "This is not good, you made really good paintings before," he didn't care. Both he and Goya did what they needed to do. So for me they are examples of courage.

Picasso, too, did this so many times. To go out of what for most people is comforting—to be good, skillful, admired, famous—and then to abandon all this to go your own way—is so very frightening to most peo-

pe But had to do this in order to get in touch with myself to become free Otherwise I feel like I am in a prison

Omni Who are your heroes?

Miller The older become the less I have heroes Even Freud was not a hero but for a long time a father figure But when I discovered his denial of the truth he wasn't even that anymore I cannot idealize anybody as I did twenty or forty years ago In my school days Socrates was a big figure and he's someone I've liked for my whole life because he questioned so many things I also liked the honesty of Montaigne I liked Kafka and I adored Shakespeare Now I can't read novels so easily anymore I am bored if I see there I like reports on childhood If they are written honestly which is rare The childhood offers the keys to the whole personality I wrote essays on Nietzsche Picasso [German expressionist] Kathe Kollwitz after I discovered facts from their childhoods that cast new light on their works It's amazing that the importance of these facts was overlooked The essays are still unpublished because I haven't had the time to put them in a new book And I'm tired of publishing books I love to write but not to publish It takes so much time and is not really creative

Omni When did you ultimately decide to write *The Drama*?

Miller Oh it was funny Actually I didn't I told you I did a paper for a conference then I wrote another on depression After the German professionals refused to print the first one I wrote the third paper and made it into a book Although I wrote it in three weeks it was an expression of twenty years experience I sent it to a small publisher in Switzerland who said they were not interested that they had four other books on narcissism Then I sent it to Suhrkamp my present German publisher The editor telephoned me the next day and said Wait please and you will have the contract in three days It's extraordinary It's so unusual And then the publisher came to visit me and said Usually I take new manuscripts home with me at lunch time This time I couldn't take my nap I had to finish it I didn't return to work that day either You made a big discovery

Omni Does response to your work differ from country to country?

Miller Yes The Scandinavian lands Holland and the United States are most liberal and open Most of my books are sold in Germany but many Germans are still very much formed by the poisonous pedagogy Swiss people too So many are not allowed to criticize parents or see the poison of their upbringing These people say my work describes the education of the nineteenth century They don't realize that they still live according to nineteenth century values

This response is also a reaction to Hitler's time The denial of Hitler is so deep that the German cannot learn from his history As a child Hitler had no witness His father destroyed everything his son did He could never tell anyone the pains he was suffering In Sweden they made a play *Hitler's Childhood* from a chapter in my book The story shows how that child looked for contact longed for a caress but was constantly treated like a dog

A reaction similar to Germany's also comes from Japan but also from Japan come reactions from people who already have become aware Their awareness is not damaged by theories like the Freudian drive theory so these Japanese can take what I write just in their reality They can realize the ever present child abuse and they can really help

Behind every act of violence there is a history A history of being molested a history of denying The denial is a law governing us but it is ignored by society and still not investigated by the professionals Yet it holds the keys to our understanding why pure nonsense can be still enthroned in our culture such nonsense as Sigmund Freud's idea that a child would invent traumas

Omni Are there cultures that have a different attitude toward parenting?

Miller Despite variations in cultures abuse is found in almost every one But there are some that are different For instance there

are people on an island of Malaysia called Senoi who have a nonviolent culture. They talk with their children about dreams each morning. They never have had war. Our culture is so violent because as children we learned not to feel.

Omni: What in general are your thoughts about dreams?

Miller: Dreams tell me the story of childhood, but childhood transformed. The problems of the previous day are mixed in. Dreams sometimes reveal repressed traumas, but they also help the dreamer to master them. Dreams are a creative force everybody has each night when the control is lessened.

Omni: Can therapy effect a change?

Miller: Yes, but only if the therapy will come to the pain, which is blocked in our feelings of guilt. The idea, I was guilty for what happened to me,' is a blockage. Since I discovered that Freud's drive theory not accidentally, but necessarily conceals the reality of child abuse, I have looked for a new form of psychotherapy, an effective therapy to be based on the whole knowledge of child abuse available to us today. I finally found it, and I will describe this concept in my next book. This therapy enables the patient and the therapist to systematically come in touch with their traumas and pain—step by step, without suddenly breaking the defenses, without moralistic and pedagogical attitudes, and without bringing people into dangerous states where they experience chaotic feelings and are stuck with them.

One can find plenty of irresponsible and harmful techniques and mixtures of techniques that don't provide a systematic confrontation with the past. Some leave people with different mystical offerings or with their unresolved pain. These patients are victims first of child abuse and finally of therapy abuse. And they try to help themselves by taking drugs, joining sects or gurus, or looking for other ways of denying reality and killing pain. Political activity can be one of these ways.

Omni: What advice would you give today to a therapist in training?

Miller: First try to discover your own childhood, then take the experience seriously. Listen to the patient and not to any theory, with your theory you are not free to listen. Forget it. Do not analyze the patient like an object. Try to feel, and help the patient to feel instead of talking to the patient about the feelings of others.

The child needs fantasies to survive, to not suffer. Believe what the patient tells you and don't forget that repressed reality is *always* worse than a fantasy. No one invents traumas because we don't need traumas in order to survive. But neither do we need their denial. Some of us pay with severe symptoms for this denial. Study the history of childhood. Therapy has to open you as well as the patient for feeling in your whole life. It has to awaken you from a sleep.

It is tragic to go to therapy and find, instead of help, confusion. I have a letter from a seventy-nine year-old woman saying that for forty years of my life I went to psychoanalysis. I saw eight analysts. But for the first time after reading your book I didn't feel guilty for what happened to me. I always tried, and the analysts were nice people. They wanted to help me. But they never doubted that my parents were good to me. I am so grateful now that I don't feel guilty since I read your books. I now see how terribly they abused me. It was first my parents and then my analysts who made me feel wrong and guilty." This insight came from a seventy-nine year-old woman! Then she quoted from the last line of *For Your Own Good*: 'For the human spirit is virtually indestructible and its ability to rise from the ashes remains as long as the body draws breath.'

Omni: Does TV violence affect children?

Miller: Children who have really been loved and protected will not be interested in these films and shows and will not be in danger. But the child who was hurt and humiliated—maybe at school, not necessarily by his parents—is looking for outcomes for material. He is looking for an object to hate and on whom to take revenge. Of course there are people who make a business of the suffering of children. But the violence doesn't come from TV films. Its sources are deeper. Protected and loved children cannot become murderers. It is impossible to find one person who was not beaten who beats a child.

> *"Children who have been loved will not be interested in violent TV shows. But the child who has been hurt is looking for material, an object on which to take revenge."*

Omni: Why does violence beget itself through the generations?

Miller: If you go back you can see that the abuser was always abused. But in most cases you will not hear it from him or her because there is so much denial. If you go to a prison and ask a murderer 'How was your childhood?' he will say "Oh, it was not so bad. My father was severe and he punished me because I was so bad. And my mother was a nice woman." This is the problem. You can't find the truth because the person, the murderer himself, will prevent you from seeing his cruel childhood as it actually was. Because he cannot bear that pain, he kills innocent people instead of feeling the pain of his childhood.

Omni: Do you think a child can experience abuse in the womb?

Miller: Of course. Each child has its own experience, some experience real martyrdom. There was a child born with three ulcers. It died. The mother was fifteen years old. She was beaten during pregnancy as well, and she used drugs. Nobody knows what a child, even in the womb, has to go through. We are so ignorant, and we refuse to know.

You heard about the McMartin School in Los Angeles? At this day-care center of more than three hundred children it was charged that many of them were sexually molested. For seven months attorneys asked the children what happened to them there. This questioning was torture for the children. Some of them reported that they helped kill a baby. The grown-ups found this wasn't true, so they called the children liars. Eventually charges were dropped against five of the seven accused molesters. But obviously this was a symbolic way to say, 'When I agreed to be sexually abused, I killed the child in myself.'

I want to show how society reacts to children's reports. Abuse means killing the soul of a child. We cannot understand the child's symbolic language, so we say the child is lying. Then abusing teachers go free, and we think that everything is legally correct. The problem is that children protect the abuser. Sometimes the abuser is exchanged for another person in their reports. They perhaps say 'I'm afraid of the mailman because he was bad to me.' And the parents know that the mailman had nobody contact with their child. But behind the 'made up' story lurks a father or uncle. The lie functions to protect the loved person but at the same time expresses anxieties. Grown-ups say that these are children who invent stories. But the story is not invented; a real event happened.

Omni: Can society learn to understand the child's language?

Miller: I hope so. Otherwise we will commit a mass suicide with the help of technology. The child's language is often very clear, but we refuse to listen to it. Children can endure terrible abuse and cruelty from the first moment of their lives, thanks to the technology in hospitals. The abuse is stored up in the mind, and it can remain active the whole life. Therefore a mother maltreating her small baby can repeat exactly what happened to her without having any knowledge, any conscious memories. But the stored up memories in her body will compel her to repeat the same trauma.

Unless a child receives the warm arms of a person who will console him and tell him with his arms that the shock of birth is over, this child will wait his whole life expecting a repetition of this shock. One of the first lessons is that you are alone in a dangerous place, and nobody sees your pain. But this situation can easily be changed when we acknowledge the newborn as a feeling and highly sensitive person. Very often the child comes into life after

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a struggle and we don't realize that he needs consolation and the arms of a mother We give him medication hospitals and high technology instead And we think it is good for the child—only because we had the same experience years ago and think it is usual What really happens in the psyche of a newborn is absolutely not interesting to most people That is why I am giving you this interview

Omni What would you like to do now?

Miller I would like to support people who are confronting child abuse I received a letter from a child therapist in California He was a consultant for a school A girl told him stories of a hot box a tiny windowless closet in which the children were locked up as punishment He believed her investigated and when he wrote a report about it was fired But he kept on investigating and found these hot boxes used in other schools Newspapers reported about the case and his voice and experience were noticed He thanked me because he felt supported by my books This shows one person can make people aware that methods they never questioned before are in fact damaging The single advocate of a child can save a life advocates say a crime is a crime they don't conceal the truth by calling it ambivalent parents love An advocate can help keep a child from becoming a criminal The child learns from an enlightened witness to recognize cruelty to reject it to defend himself against it so as not to perpetuate it Experiments have conclusively proven that no one learns anything by punishment What you learn is how to avoid punishment by lies and how to punish a child twenty to thirty years later People continue to believe however that punishment can be effective

Omni Can you change this belief?

Miller. I hope so at least partly My life and work concentrate on the problem of child abuse and on the question of how I can transmit what I have learned about it to professionals parents and people responsible for law It's not easy because most people learned from the beginning of their lives that the child has to be spanked in order to become as good human honest tolerant as the teachers parents ministers and others around them believe that they are

In England where I've given some radio shows interviewers often say You talk about the serious forms of violence and brutality in families but there are also other forms spankings caning shouting at a child The interviewers claim these forms of exercising power are harmless and not serious and they argue that although they were often spanked as children they didn't become an Adolf Hitler I see it as my task to repeat that each kind of beating caning and spanking of a child is a humiliation and is a serious damage for his whole life A child can avoid becoming a criminal if he has the chance in childhood to meet at least one person who is not cruel to him who maybe even likes him or understands him The experience of love compassion or sympathy would help him to recognize cruelty for what it is Children who lack this experience because there is no conscious witness will see cruelty as a normal way of treating children and will continue with this burden They will become as Hitler Eichmann [Rudolf] Hoss and all the millions of their followers who in their childhoods never found anything but cruelty

Omni What about the milder forms of cruelty such as spanking shouting and verbal humiliation?

Miller The tragedy is that people treated this way even if they don't become like Hitler pretend that this kind of treatment was necessary They reserve the right to do the same to their children and are reluctant to pass laws forbidding spanking In Britain such a law was not passed until 1986 and I see this delay as one of the effects of child abuse there

The ignorance of our society is the result of child abuse We were spanked in order to become blind like Oedipus We have to become seeing in order to give our children the chance to grow up with more responsibility and more awareness than was available for our generation now producing atomic bombs ∞

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vironmental ends are Corale and James Brierley. After years of studying naturally occurring microorganisms that eat metal substances they harnessed the microbes to help rid the environment of toxic metals. Both microbiologists the Brierleys left secure positions at the New Mexico Institute of Mining and Technology to commercialize their process. James refined the technology while Corale plunged into corporate planning. By manipulating the properties of these metal eaters they produced a method that decontaminates water and simultaneously recovers the metals for recycling.

Corale Brierley explains. Microorganisms are charged. If you drop a microorganism into a beaker with metal it will attract the metal as a magnet would. We use this characteristic of microorganisms to create a granular substance that within minutes gleans ninety-nine percent of the heavy metals out of the water. In this process pumps shoot metal-laden water through a container filled with microbial granules. The granules attract the metal particles and then sink to the bottom.

Poisonous metals foul the water used by at least 25 different types of industry: battery making electroplating and the manufacture of transistors for example—and frequently ooze into groundwater or land fills. Some of the current technologies used to rid water of metals actually create another toxic problem. They purify water—but at the price of collecting the metal particles into masses of gummy poisonous sludge. The sludge must then be disposed of as hazardous waste. 'By recovering the metals' says Brierley 'our technique reduces by a thousandfold the amount of hazardous waste that would be created by the methods that produce sludge.' The Brierleys believe their technology could cleanse millions of gallons of contaminated water a day nationwide at a lower cost than current disposal processes.

Few would claim that technology alone can resolve the world's ponderous ecological dilemmas. 'High technology is not a panacea for major environmental problems' cautions David Wilcove staff ecologist at the Wilderness Society in Washington DC. 'The long-term solution to some of these problems is proper land preservation and management. But as a tool high tech has an important role to play in particular environmental issues. For instance Landsat imaging can keep an eye on the disappearing tropical forests while computers keep track of what's there. Radiotelemetry can help figure out the population densities and home range of a particular species so you know which habitats it uses and how much it needs.'

Perhaps the most basic environmental need is for humanity to undergo a 'quasi-religious transformation,' in the words of Stanford ecologist Paul Ehrlich. Only then might we value the living breathing organism that is Earth for its own sake, apart from the benefits it gives us. ☒

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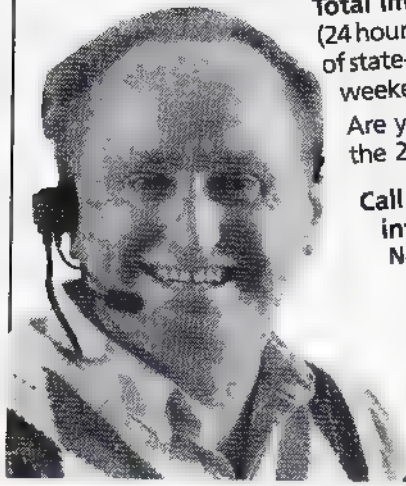

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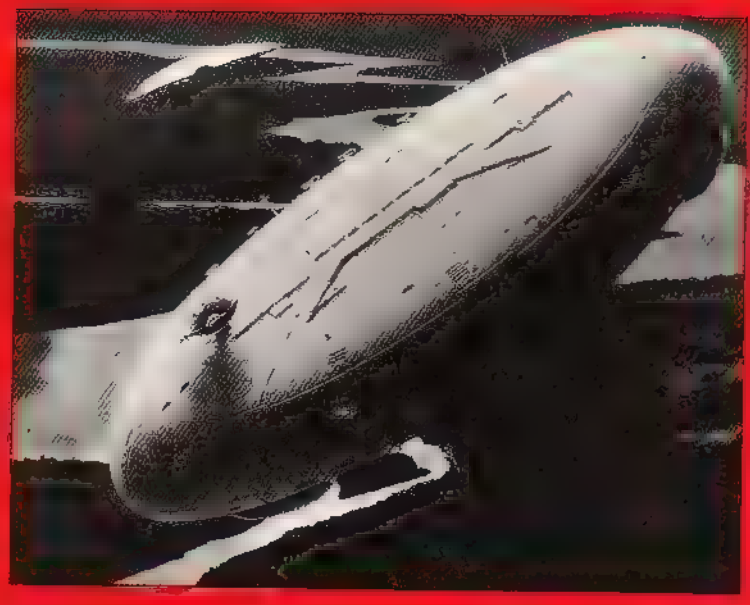

'UFOs' says Connecticut lawyer Robert H. Bletchman 'are the Rodney Dangerfield of science. If we were being contacted by extraterrestrial intelligence, it should be a monumental historic event. Instead, the subject matter is denigrated to the point of ridicule.'

After 20 years of frustration, Bletchman, who is a consultant for the Mutual UFO Network (MUFON), finally decided it was time to tackle the UFOs poor public image himself. First he roughed out a legal-pad ploy designed to enhance the public's perception of UFOs and to force the government to reveal evidence he believes it's hiding. Then he began a round of visits to advertising executives who could offer 'a professional's advice.'

The first few firms Bletchman contacted laughed in his face. But finally executives at Charnas Inc., one of New England's top 20 advertising agencies (clients have included Gillette, Timex and Polaroid), perked up their ears.

Charnas officials insist they're as straight-laced about the UFO public relations campaign as MUFON's. 'We plan to approach the issue intelligently and rationally in a way that won't possibly reflect poorly on us,' says Joyce Silverman, agent in charge of the account. 'We'll use the rules of advertising to attack a problem unique in its overtones. That's not to say we won't strike an emotional note in any of our advertising, but we certainly won't be sensational.'

Silverman says she's never seen a UFO herself. 'But I've spoken with people who have, who were shaken by it and who felt embarrassed to talk about it,' she says. 'That's not right. We should help these people find an explanation. A responsible approach to an issue surrounded by too many questions and mysteries is long overdue.'

As plans stand, Charnas will kick off the UFO ad campaign with promotional letters to 100,000 people on a target mailing list. Hollywood figures whose interest in UFOs is a matter of public record, Shirley MacLaine for instance, and Sammy Davis Jr., will be contacted first. Contributions from this group will be used to test the ad campaign in regional publications. Once the results from *that* are in, the media blitz will begin. Charnas will put UFO ads in national magazines like *Omni* and *Esquire*. Then the agency will air commercials on prime time TV.

'I'd like to see someone important involved in these commercials,' astronaut Duke Slayton, for instance, who did the HBO UFO documentary and who says he's seen a UFO himself,' Bletchman says. 'He could say the government made quite a monetary investment in his skills as a trained observer, so why not treat him seriously now?'

Whatever form the ads take, Charnas says, their aim will be clear: release of all secret government UFO documents, increased editorial coverage of UFO issues and new awareness of the scientific and technological advances that UFOs could bring to the inhabitants of Earth.

This campaign will get the message out there, Bletchman contends. It will reach policymakers and generate funds. The more money, the more UFO ads, and the more the hornet's nest gets stirred. — *DENNIS STACEY*

When Charles Dickens died in 1870 his final book, *The Mystery of Edwin Drood*, was incomplete A number of eager imitators attempted to finish the manuscript, and several bogus endings found their way into print

The most flamboyant of these attempts was executed by T P James, a young mechanic and psychic living in Vermont James claimed little familiarity with Dickens or his literary works He was able to complete the novel in 1873 he declared only when the surviving spirit of Dickens appeared and showed him how

Intrigued by James's claim two California researchers plan to use a computer to investigate it further Parapsychologist Jerry Solfvin and graduate student Jo Coffey both of John F Kennedy University in Orinda point out that the computer can be programmed to analyze the peculiarities of a writer's style It can then compare *two* pieces of literature and determine whether they were written by the same person

Even if the computer puts its stamp of approval on James's piece, can the spirit hypothesis be proved? 'I don't think so So fvin says 'That's not our ultimate goal What we will demonstrate is that a *computer technique* can help evaluate psychic information channeled from one person to the next "

Whatever the outcome of the experiment Dickens fans aren't likely to be convinced Even the self proclaimed psychics among them say James's story has been suspect ever since a biographer found a rough draft of an unpublished chapter among Dickens's things James's version doesn't include this chapter at all

But Solfvin and Coffey are not impressed by this 'it's a weak criticism ' Coffey says Authors change their minds at the time "

—D Scott Rogo

One of the strangest chapters in the history of the miraculous began in April 1968 That was the month a shining apparition—widely believed to resemble the Virgin Mary—began appearing nightly atop St Mary's Coptic Church in Zeitoun a suburb of Cairo Egypt Thousands claimed to see the figure which didn't disappear until 1971

But just about a year ago the apparition returned, this time over St Demiana's, another Coptic church outside of Cairo At first, according to reports the figure heralded by a bright light, appeared only in the early morning hours As the weeks went on it appeared briefly several times per night attracting large crowds in the streets below

Other mysterious phenomena have supposedly occurred during the phantom's manifestations, too Several witnesses report that the dome of the church lights up and that the smell of incense sometimes pervades the entire area The crowds near the church have grown so large that the Cairo police have been brought in to keep order

In one instance the apparition stayed for twenty minutes ' says Mousaad Sadik, who has been covering the story for *Watani* a Cairo-based paper "Spellbound the people started to plead and pray "

But religious miracles don't sit too well with the scientific establishment According to California physiologist and skeptic Gordon Stein "Possible explanations include fraud, hallucinations a natural optical phenomenon or electrical discharges from the roof of the church "

Meanwhile, the Coptic Church has been soliciting eyewitness reports of the manifestations After evaluating some of these reports officials declared the visions "blessings to Egypt and blessings to the Church '

—D Scott Rogo

Does anything unusual occur within the brain when a person receives an ESP message? Two researchers affiliated with the University of Illinois think it does.

Cognitive neuroscientists Charles A. Warren and Norman S. Don conducted their research with a single subject whose brain activity was monitored by an electroencephalograph. His job was to guess the geometric symbols printed on a series of standard ESP cards. (Each card is printed with either a cross, circle, square, star or wavy lines.) When the subject finished carrying out this task, the researchers looked at the brain signals, also known as event related potentials or ERPs. These consist of tiny electrical fluctuations that occur milliseconds before or after the reception of any given stimulus. The two researchers specifically looked at the ERPs for predetermined millisecond periods before and after the subject made his guesses.

As it turned out, the researchers said, the subject guessed correctly close to 50 percent of the time. (A scoring rate of 20 percent would be expected as a result of chance.) When the researchers checked their EEG data, they discovered that ERPs often accompanied the correct guesses. In fact, ERP analysis enabled them to discriminate between correct and incorrect guesses at a rate of 72.7 percent.

"We have several hopes for future work in this area," Warren says. "One is that studies using such ERP monitoring will be able to yield even more accurate indicators of psi states."

Despite the sophistication of this experiment, the subject—a Chicago psychic named Olof Jonsson—has in the past been involved in some controversy concerning his ESP abilities.

Jonsson may or may not be a psychic, opines Marcello Truzzi, sociologist and anomalies expert at Eastern Michigan University in Ypsilanti. It's impossible to tell because no adequately controlled test has ever proved or disproved his psychic abilities.

Either way, Truzzi adds, the results are intriguing. "This experiment is interesting because it seems to show a difference in brain signals when the subject knows the answer. That is significant whether the answer is obtained psychically or not. Indeed, one might use such a technique to determine whether a person has merely guessed at the correct answer in any given situation or somehow knows it."

D. Scott Rogo

Here human beings pass as glimmers, and a glimpse of everything is had through the transparent atmosphere. Everything is illuminated and quivers under waves of light propagated in space.

Gustave Geffroy

I am darkness leaping out of light, leaping out of thee.

Herman Melville

"Light is an electric wave."

-Heinrich Hertz

Ten years ago strange things began happening in the Orchard family cottage. First the Orchards say, doors and water faucets started flying around. Then a ceiling collapsed, water saturated furniture and electrical appliances went awry.

It didn't take long for the family to abandon its home in the village of Adisham in Kent, England, claiming that thousands of dollars' worth of damage had been incurred. Eventually, Joe Orchard, a former Royal Navy petty officer, began to blame the disturbances on what he called "electro-osmosis": electricity leaking from a cable. A powerful magnetic field had been created around the cottage, he said, by a malfunctioning breaking transformers. The family was able to move back home, he added, only after electrodes had been planted around the house.

When the local utility, the South Eastern Electricity Board, denied responsibility for the happenings, Orchard and his wife started a nine-year legal battle to recover damages. But after a 12-day hearing in London's High Court last year, the judge threw out the claim. Orchard, his wife, Joyce, and their twenty-three-year-old son, David, he declared, had only themselves to blame. He accused them of being untruthful and referred to an occasion when an electricity expert called at the cottage, to find David holding a cup of water. It was fair to infer, the judge declared, that David had been splashing the water around the cottage.

When Joe Orchard died just recently at age sixty-five, his wife blamed it on the outcome in court. "We told the truth in court, but were branded liars, and that broke his heart," she says. "Now it's killed him." Ivor Smullen

CHILDREN

CONTINUED FROM PAGE 88

"No . . . I don't exactly remember. Maybe a clue?"

But before he could offer her another piece of his mystery, he heard voices.

"Can't talk now, Mrs. Jape."

"Call me Vanessa."

"May I?" His face bloomed in the warmth of her beneficence. "Vanessa."

"You *will* help me?" she said.

"As best I may," he replied. "But if you see me in company—"

"We never met."

"Precisely. *Au revoir.*" He closed the pane in the door and she heard his footsteps vanish down the corridor. When her custodian, an amiable thug called Guillemot, arrived several minutes later bearing a tray of tea, she was all smiles.

Her outburst of the previous day seemed to have borne some fruit. That morning, after breakfast, Mr. Klein called in briefly and told her that she would be allowed out into the grounds of the place (with Guillemot in attendance) so she might enjoy the sun. She was further supplied with a new set of clothes—a little large but a welcome relief from the sweaty garments she had worn for over twenty-four hours. Pleased though she was to be wearing clean underwear, the fact that the clothes had been supplied at all suggested Mr. Klein was not anticipating a prompt release.

How long would it be, she tried to calculate, before the rather obtuse manager of her tiny hotel realized that she wasn't coming back and, in that event, what would he do? Perhaps he had already alerted the authorities; perhaps they would find the abandoned car and trace her to this curious fortress. On this last point her hopes were dashed that very morning during her constitutional. The car was parked in the laurel-tree enclosure beside the gate and, to judge by the copious blessings rained upon it by the doves, had been there overnight. Her captors were not fools. She might have to wait until somebody back in England became concerned and attempted to trace her whereabouts, during which time she might well die of boredom.

Others in the place had found diversions to keep them from insanity's door. As she and Guillemot wandered around the grounds that morning she could distinctly hear voices—one of them Gomm's—from a nearby courtyard. They were raised in excitement.

"What's going on?"

"They're playing games," Guillemot replied.

"Can we watch?" she asked casually.

"No—"

"I like games."

"Do you?" he said. "We'll play, then, eh?"

This wasn't the response she'd wanted, but pressing the point might have aroused suspicion.

"Why not?" she said. Winning the man's trust could only be to her advantage.

"Poker?" he said.

"I've never played."

"I'll teach you," he replied. The thought clearly pleased him. In the adjacent courtyard the players now sent up a din of shouts. It sounded like some kind of race to judge by the mingled cries of encouragement and the subsequent deflation as the winning post was achieved. Guillemot caught her listening.

"Frogs," he said. "They're racing frogs."

Once her attention focused on the sound of the games, she could not drive the din from her head. It continued through the afternoon, rising and falling. Sometimes laughter would erupt, as often there would be arguments. They were like children, Gomm and his friends, the way they fought over such an inconsequential pursuit as racing frogs. But in lieu of more nourishing diversions, could she blame them? When Gomm's face appeared at the door later that evening, almost the first thing she said was "I heard you this morning, in one of the courtyards. This afternoon, too. You seemed to be having a good deal of fun."

> *"She let herself out of the cell, then she hurried along the cloisters, cleaving to the shadows. She found her way into the yard, pausing to work out which way the exit lay."*

"Oh, the games," Gomm replied. "It was a busy day. So much to be sorted out."

"Do you think you could persuade them to let me join you? I'm getting so bored."

"Poor Vanessa. I wish I could help. But it's practically impossible. We're so overworked at the moment, especially with Floyd's escape."

Overworked, she thought. *Racing frogs?* Fearing to offend, she didn't voice the doubt. "What's going on here?" she said. "You're not criminals, are you?"

Gomm looked outraged. "*Criminals?*"

"I'm sorry."

"No. I understand why you asked. It must strike you as odd, our being locked up here. But no, we're not criminals."

"What, then? What's the big secret?"

Gomm took a deep breath before replying. "If I tell you," he said, "will you help us to get out of here?"

"How?"

"Your car. It's at the front."

"Yes, I saw it."

"If we can get to it, would you drive?"

"How many of you?"

"Four. There's me, there's Irenya, there's Mottershead and Goldberg. Of course, Floyd's probably out there somewhere, but he'll just have to look after himself, won't he?"

"It's a small car," she warned.

"We're small people," Gomm returned. "You shrink with age, you know, like dried fruit. And we're *old.* With Floyd we had three hundred and ninety-eight years between us. All that bitter experience," he said, "and not one of us wise."

In the yard outside Vanessa's room, shouting suddenly erupted. Gomm disappeared from the door and reappeared again briefly to murmur, "They found him. Oh, my God, they found him." Then he fled.

Vanessa crossed to the window and peered through. She could not see much of the yard below, but what she could see was full of frenzied activity, sisters hithering and thithering. At the center of this commotion she could see a small figure, the runaway Floyd, no doubt—struggling in the grip of two guards. He looked to be much the worse for his days and nights of living rough, his drooping features dirtied, his balding pate peeling from an excess of sun. Vanessa heard the voice of Mr. Klein rise above the babble, and he stepped into the scene. He approached Floyd and proceeded to berate him mercilessly. Vanessa could not catch more than one in every ten words, but the verbal assault rapidly reduced the old man to tears. She turned away from the window, silently praying that Klein would choke on his next piece of chocolate.

So far, her time here had brought a curious collection of experiences, one moment pleasant, the next unpalatable. And still she was no nearer understanding what the function of this prison was, why it only had five inmates (six, if she included herself) and all so old. "Shrunk by age," Gomm had said. But after Klein's humiliation of Floyd she was now certain that no secret, however pressing, would keep her from aiding Gomm in his bid for freedom.

The professor did not come back that evening, which disappointed her. Perhaps Floyd's recapture had meant stricter regulations about the place, she reasoned, though that principle scarcely applied to her. She, it seemed, was practically forgotten. Though Guillemot brought her food and drink, he did not stay to teach her poker as they had arranged, nor was she escorted out to take the air. Left in the stuffy room without company, her mind undisturbed by any entertainment but counting her toes, she rapidly became listless and sleepy.

Indeed, she was dozing through the middle of the following afternoon when something hit the wall outside the window. She got up and was crossing to see what the sound was when an object was hurled through the window. It landed with a clunk

on the floor. She went to snatch a glimpse of the sender, but he'd gone.

The tiny parcel was a key wrapped in a note: VANESSA. BE READY. YOURS IN SAECULA SAECORUM. H.G.

Latin was not her forte, she hoped the final words were an endearment, not an instruction. She tried the key in the door of her cell. It worked. Clearly Gommard didn't intend her to use it now, however, but to wait for some signal. BE READY, he'd written. Easier said than done, of course. It was so tempting, with the door open and the passageway out to the sun clear, to forget the others and make a break for it. But H.G. had doubtless taken some risk acquiring the key. She owed him her allegiance.

After that, there was no more dozing. Every time she heard a footstep in the cloister or a shout in the yard, she was up and ready. But Gommard's call didn't come. The afternoon dragged on into evening. Guillemot appeared with another pizza and a bottle of Coca-Cola for dinner, and before she knew it, night had fallen and another day was gone.

Perhaps they would come by cover of darkness, she thought, but they didn't. The moon rose, its seas smirking, and there was still no sign of H.G. or the promised exodus. She began to suspect the worst: that their plan had been discovered and they were all being punished for it. If so, would not Mr. Klein sooner or later root out her involvement? Though her part had been minimal, what sanctions might the chocolate man take out against her? Sometime after midnight she decided that waiting here for the ax to fall was not her style at all, and she would be wise to do as Floyd had done, and run for it.

She let herself out of the cell and locked it behind her, then hurried along the cloisters, cleaving to the shadows as best she could. There was no sign of human presence—but she remembered the watchful Virgin. Nothing was to be trusted here. By stealth and sheer good fortune, she eventually found her way out into the yard in which Floyd had faced Mr. Klein. There she paused to work out which way the exit lay from here. But clouds had moved across the face of the moon, and in darkness her little sense of direction deserted her completely. Trusting to luck, she chose one of the exits from the yard and slipped through it, following her nose along a covered walkway that twisted and turned before leading out into yet another courtyard larger than the first. A light breeze teased the leaves of two entwined laurel trees in the center of the yard. Night insects tuned up in the walls. Peaceable as it was, the square offered no promising route she could see, and she was about to go back the way she'd come when the moon shook off its veils and lit the yard from wall to wall.

It was empty but for the laurel trees and their shadow, but that shadow fell across an elaborate design that had been painted on the pavement of the yard. She stared at it, too curious to retreat, though she could

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make no sense of the thing at first the pattern seemed to be just that a pattern She stalked it along one edge trying to fathom its significance Then it dawned on her that she was viewing the entire picture upside down She moved to the other side of the courtyard and the design came clear It was a map of the world reproduced down to the most insignificant site All the great cities were marked and the oceans and continents crisscrossed with hundreds of fine lines that marked latitudes longitudes and much else besides Though many of the symbols were idiosyncratic it was clear that the map was rife with political detail contested borders territorial waters, exclusion zones Many of these had been drawn and redrawn in chalk as if in response to daily intelligence In some regions where events were particularly fraught, the landmass was all but obscured by scribblings

Fascination came between her and her safety She didn't hear the footsteps at the North Pole until their owner was stepping out of hiding and into the moonlight She was about to make a run for it when she recognized Gomm

Don't move, he murmured across the world

She did as she was instructed Glancing around him like a besieged rabbit until he was certain the yard was deserted HG crossed to where Vanessa stood

'What are you doing here?" he demanded of her

"You didn't come " she accused him " thought you'd forgotten me'

Things got difficult They watched us all the time

'I couldn't go on waiting Harvey This is no place to take a holiday "

"You're right " he said, a picture of dejection It's hopeless You should make your getaway Forget about us They'll never let us out The truth's too terrible

"What truth?"

He shook his head 'Forget about it For get we ever met '

Vanessa took hold of his spindly arm 'I will *not* she said 'I have to know what's happening here '

Gomm shrugged Perhaps you should know Perhaps the world should know' He took her hand and they retreated into the relative safety of the cloisters

"What's the map for?" she asked

'This is where we play " he replied, staring at the turmoil of scrawlings on the courtyard floor He sighed Of course it wasn't always games But systems decay, you know It's an irrefutable condition common to both matter and ideas You start off with fine intentions and in two decades

two decades he repeated as if the fact appalled him afresh " we're playing with frogs

"You're not making much sense Harvey" Vanessa said 'Are you being deliberately obtuse or is this senility?'

He pricked at the accusation but held the trick Gaze still fixed on the map of the world he delivered the next words crisply as if he'd rehearsed this confession

There was a day of sanity back in 1962, in which it occurred to the potentates that they were on the verge of destroying the world Even to potentates the idea of an Earth only fit for cockroaches was not particularly beguiling If annihilation was to be prevented they decided our better instincts had to prevail The mighty gathered behind locked doors at a symposium in Geneva There had never been such a meeting of minds The leaders of politburos and parliaments congresses senates the lords of the earth in one colossal debate And it was decided that in the future world affairs should be overseen by a special committee made up of great and influential minds like my own men and women who were not subject to the whims of political favor, who could offer some guiding principles to keep the species from mass suicide This committee was to be made up of people in many areas of human endeavor the best of the best an intellectual and moral elite whose collective wisdom would bring a new golden age That was the theory, anyway

The guard escorted H.G away, and the captain lingered to murmur "Who's a good boy?" under his breath, then followed The courtyard was empty again but for the map of the world

Vanessa listened without voicing the hundred questions his short speech had so far brought to mind Gomm went on

And for a while it really worked There were only thirteen of us to keep some consensus a Russian a few of us Europeans dear Yoriyoko of course a New Zealander a couple of Americans . A high powered bunch Two Nobel prizewinners, myself included -'

Now she remembered Gomm, or at least where she'd once seen that face They had both been much younger She a schoolgirl, taught *his* theories by rote

Our brief was to encourage mutual understanding between the powers that be, help shape compassionate economic structures, and develop the cultural identity of emergent nations All platitudes, of course but they sounded fine at the time As it was almost from the beginning our concerns were *territorial*

'Territorial?'

Gomm made an expansive gesture taking in the map in front of him 'Helping to divide the world up ' he said 'Regulating little wars so they didn't become big wars, keeping dictatorships from getting too full of themselves We became the world's domestics, cleaning up wherever the dirt got too thick It was a great responsibility but we shouldered it quite happily It rather pleased us at the beginning, to think that we thirteen were shaping the world and that nobody but the highest echelons of government knew that we even existed '

This thought Vanessa was the Napoleon syndrome writ large Gomm was indisputably insane but what a heroic insanity! And it was essentially harmless Why did they have to lock him up? He surely wasn't capable of doing damage

'It seems unfair, she said, that you're locked away in here —"

Well that's for our own security of course " Gomm replied "Imagine the chaos if some anarchist group found out where we operated from, and did away with us *We run the world* It wasn't meant to be that way but as I said systems decay As time went by, the potentates—knowing they had us to make critical decisions for them concerned themselves more and more with the pleasures of high office and less and less with *thinking* Within five years we were no longer advisers but surrogate overlords, juggling nations

'What fun " Vanessa said

For a while, perhaps ' Gomm replied 'But the glamour faded very quickly And after a decade or so the pressure began to tell Half of the committee are already dead Golovatenko threw himself out of a window Buchanan—the New Zealander had syphilis and didn't know it Old age caught up with dear Yoriyoko, and Bernheimer and Sourbutts'll catch up with all of us sooner or later, and Klein keeps promising to provide people to take over when we've gone but they don't give a damn! We're functionaries that's all ' He was getting quite agitated 'As long as we provide them with judgments, they're happy We ' his voice dropped to a whisper "we're giving it up '

Was this a moment of self-realization? Vanessa wondered Was the same man in Gomm's head attempting to throw off the fiction of world domination? If so, perhaps she could aid the process

You want to get away? she said

Gomm nodded 'I'd like to see my home once more before die I've given up so much Vanessa for the committee, and it almost drove me mad"— *Ah*, she thought *he knows* "Does it sound selfish if say that my life seems too great a sacrifice to make for global peace?' She smiled at his pretensions to power 'If it does, it does! I'm unrepentant I want out! I want—

Keep your voice down, she advised He remembered himself and nodded

"I want a little freedom before I die We all do And we thought you could help us you see He looked at her "What's wrong?

'Wrong?

The Artist

© ART CUMINGS

Why are you looking at me like that?

You're not with Harvey. I don't think you're dangerous, but—

Wait a minute. Gomm said. What do you think we've been telling you? I go to all this trouble—

Harvey. It's a fine story.

Story? What do you mean, story? Oh, I see. You don't believe me, do you? That's typical. I tell you the greatest secret in the world, and you don't believe me.

I'm not saying you're lying.

What? You think I'm a liar! Gomm exploded. His voice echoed around the rectangular world. Almost immediately there were voices from several buildings and fast upon those the thunder of feet.

Now look what you've done, he said. I've done?

We're in trouble.

Look, H.G., this doesn't mean—

Too late for retractions. You stay where you are. I'm going to make a run for it. Distract them.

He was about to depart when he turned back to her, caught hold of her hand and put it to his lips. I'm mad, he said. You made me that way.

Then he was off, his short legs carrying him at a fair speed across the yard. He did not even reach the cedar trees, however, before the guards arrived. They shouted for him to stop. When he failed to do so, one of the men fired. Bullets plowed the ocean around Gomm's feet.

All right, he yelled, coming to a halt and putting his hands in the air. Mea culpa.

The firing stopped. The guards parted as their commander stepped through.

Oh, it's you, Sidney, H.G. said to the captain. The man visibly flinched to be so addressed in front of inferior ranks.

What are you doing out at this time of night? Sidney demanded.

Stargazing, Gomm replied.

You weren't alone, the captain said. Vanessa's heart sank. There was no route back to her room without crossing the open courtyard, and even now, with the alarm raised, Guillemot would probably be checking on her.

That's true, said Gomm. She wasn't alone. Had she offended the old man so much he was now going to betray her?

I saw the woman you brought in.

Where?

Climbing over the wall, he said.

Jesus wept, the captain said and, swinging around to order his men in pursuit, said to her, Gomm was chatting, I said, You break your neck climbing over the wall. You'd be better off waiting until the gate—

Shut the fuck up. He wasn't such a snitch after all. Pressing the captain said yes, sir. Harvey, back to his lecture.

Gomm protested. I don't need a bedtime story, thank you.

Shh, Harvey.

The guard crossed to H.G. and escorted him away. The captain ingered long

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enough to murmur Who's a clever boy Sidney? under his breath then followed The courtyard was empty again but for the moonlight and the map of the world

Vanessa waited until every last sound had died and then slipped out of hiding, taking the route the dispatched guards had followed It led her, eventually, into an area she vaguely recognized from her walk with Guillemot Encouraged she hurried on along a passageway that let out into the yard with Our Lady of the Electric Eyes She crept along the wall and ducked beneath the statue's gaze and out finally, to meet the gates They were indeed open As the old man had protested when they'd first met security was woefully inadequate and she thanked God for it

As she ran toward the gates she heard the sound of boots and glanced over her shoulder to see the captain rifle in hand, stepping from behind a tree "Some chocolate Mrs Jape?" said Mr Klein

This is a lunatic asylum, she told him when they had escorted her back to the interrogation room "Nothing more nor less You've got no right to hold me here

He ignored her complaints You spoke to Gomm " he said "and he to you "

"What if he did?"

"What did he tell you?"

"I said, What if he did?"

And I said *What did he tell you?*" Klein roared She would not have guessed him capable of such apoplexy I want to know, Mrs Jape"

Much against her will she found herself shaking at his outburst

"He told me nonsense, she replied "He's insane I think you're *all* insane "

"What nonsense did he tell you?"

It was rubbish

"I'd like to know Mrs Jape " Klein said his fury abating "Humor me "

"He said there was some kind of committee at work here that made decisions about world politics and that he was one of them That was it for what it's worth "

"And?"

"I told him he was out of his mind "

Mr Klein forged a smile "Of course this is a complete fiction " he said

"Of course Jesus Christ don't treat me like an imbecile I'm a grown woman "

Mr Gomm "

"He said he was a professor

"Another delusion *Mr* Gomm is a paranoid schizophrenic He can be extremely dangerous, given half a chance You were pretty lucky "

And the others?

"Others?

"He's not alone I've heard them Are they all schizophrenics?

Klein sighed "They're all deranged though their conditions vary And in their time unlikely as it may seem they've all been killers "He paused to allow this information to sink in Some of them must be killers That's why they have this place to themselves hidden away That's why the officers are armed "

She opened her mouth to ask why they were required to masquerade as nuns, but he wasn't about to give her an opportunity

"Believe me, it's as inconvenient for me as it's irritating for you to be here " he said "Then let me go

"When my investigations are complete " he said "in the meanwhile your cooperation would be appreciated If Mr Gomm or any of the other patients tries to co-opt you into some plan or other please report them to me *immediately* Will you do that?"

"I suppose"

"And *please* refrain from any further escape attempts The next could be fatal "

"I wanted to ask—"

"Tomorrow maybe " Mr Klein said glancing at his watch as he stood up "For now, sleep

Which she debated with herself when that sleep refused to come, of all the routes to the truth that lay before her was the *unlikeliest* path? She had been given several

> *"He slid on the floor and stumbled against the shower, yelping as scalding water met his scalp His rifle clattered to the floor. By the time he righted himself, it was in her hand"*

alternatives by Gomm by Klein by her own common sense All of them were temptingly improbable All like the path that had brought her here unmarked as to their final destination She had suffered the consequence of her perversity in following that track, of course, here she was weary and battered locked up with little hope of escape But that perversity was her nature as Ronald once said the one indisputable fact about her If she disregarded that instinct now despite all it had brought her to, she was lost She lay awake turning the available alternatives over in her head By morning she had made up her mind

She waited all day hoping Gomm would come, but she wasn't surprised when he failed to show It was possible that events of the previous evening had landed him in deeper trouble than even he could talk his way out of She was not left entirely to herself however Guillemot came and went with food with drink and in the middle of the afternoon with playing cards She picked up the gist of five card poker quite rapidly and they passed a contented hour or two playing while the air carried shouts from the courtyard where the bedlamites were racing frogs

"Do you think you could arrange for me to have a bath or at least a shower?" she asked him when he came for her dinner tray that evening "It's getting so that I don't like my own company "

He actually smiled as he responded "I'll find out for you "

"Would you?" she gushed

He returned an hour later to tell her that a dispensation had been sought and granted would she like to accompany him to the showers?

Are you going to scrub my back?" she casually inquired

Guillemot's eyes flickered with panic at the remark and his ears flushed beetroot red "Please follow me " he said Obediently she followed trying to keep a mental picture of their route should she want to retrace it later without her custodian

The facilities he brought her to were far from primitive and she regretted walking into the mirrored bathroom that actually washing was not high on her list of priorities Cleanliness was for another day

"I'll be outside the door " Guillemot said

"That's reassuring " she replied, offering him a look she trusted he would interpret as promising, and closed the door Then she ran the shower as hot as it would go Until steam began to cloud the room and went down on her hands and knees to soap the floor When the bathroom was sufficiently veiled and the floor sufficiently slick she called Guillemot She might have been flattered by the speed of his response but she was too busy stepping behind him as he fumbled in the steam and giving him a hefty push He slid on the floor and stumbled against the shower yelping as scalding water met his scalp His automatic rifle clattered to the floor and by the time he was righting himself she had it in her hand and pointed at his torso, a substantial target Though she was no sharpshooter and her hands were trembling a blind woman couldn't have missed at such a range she knew it and so did Guillemot He put his hands up

"Don't shoot "

"If you move a muscle "

"Please don't shoot

"Now take me to Mr Gomm and the others Quickly and quietly

"Why?"

"Just take me," she said gesturing with the rifle that he should lead the way out of the bathroom "And if you try to do anything clever, I shoot you in the back " she said "I know it's not very manly but then I'm not a man I'm just an unprepossessing woman So treat me very carefully "

"Yes

He did as he was told meekly leading her out of the building and through passageways that took them toward the bell tower and the complex clustered about it She had always assumed this, the heart of the fortress to be a chapel She could not have been more wrong The outer shell

might be tiled roof and whitewashed walls, but that was merely a facade: they stepped over the threshold into a concrete maze more reminiscent of a bunker than a place of worship. It briefly occurred to her that the place had been built to withstand a nuclear attack: an impression reinforced by the fact that the corridors all led down. If this was an asylum, it was built to house some rare lunatics.

'What's this place?' she asked.

We call it the Boudoir,' Guillemot said. 'It's where everything happens.'

There was little happening at present: most of the offices off the corridors were in darkness; in one room a computer calculated its chances of independent thought unattended; in another a telex machine wrote love letters to itself. They descended into the bowels of the place unchallenged; at last, rounding a corner, they came face-to-face with a woman on her hands and knees, scrubbing the linoleum. The encounter startled both parties, and Guillemot was swift to take the initiative. He knocked Vanessa sideways against the wall and ran for it. Before she had time to get him in her sights, he was gone.

She cursed herself: it would be only moments before alarm bells started to ring and guards came running. She was lost if she stayed where she was. The three exits from this hallway looked equally uncompromising, so she simply made for the nearest, leaving the cleaner to stare after her. The route she took proved to be another adventure. It led her through a series of rooms, one of which was lined with dozens of clocks, all showing different times; the next of which contained upwards of fifty black telephones; the third and largest was lined on every side with television screens. They rose, one upon another, from floor to ceiling. All but one were blank. The exception was showing what she first took to be a mud wrestling contest, but was in fact a poorly reproduced pornographic film. Sitting watching it, sprawled on a chair with a beer can balanced on his stomach, was a mustached man. He stood up as she entered – caught in the act. She pointed the rifle at him. 'I'm going to shoot you dead,' she told him.

'Shit.'

'Where's Gomm and the others?'

'What?'

'Where are they?' she demanded. 'Quickly!'

'Down the hall. Turn left and left again,' he said. Then added: 'I don't want to die.'

'Then sit down and shut up.'

'Thank God,' he said.

'Why don't you?' she told him. As she backed out of the room, he fell down on his knees while the mud wrestlers cavorted behind him.

Left and left again. The directions were fruitful. They led her to a series of rooms. She was just about to knock on one of the doors when the alarm sounded. Throwing caution to the wind, she pushed all the doors open. Voices from within com-

panned at being awakened and asked what the alarm was ringing for. In the third room she found Gomm. He grinned at her.

'Vanessa,' he said, bounding out into the corridor. He was wearing a long vest and nothing else. 'You came, eh? *You came!*'

The others were appearing from their rooms, bleary-eyed: with sleep, Irenya Floyd, Mottershead, Goldberg. She could believe, looking at their raddled faces, that they indeed had four hundred years between them.

'Wake up, you old buggers,' Gomm said. He had found a pair of trousers and was pulling them on.

The alarm's ringing: one commented. His hair, which was bright white, was almost at his shoulders.

They'll be here soon,' Irenya said.

No matter,' Gomm replied.

Floyd was already dressed. 'I'm ready,' he announced.

'But we're outnumbered,' Vanessa protested. 'We'll never get out alive.'

'He revved the car until the engine fairly screeched. Dust was flung up and through the gap where the door had been. A goat fled from the path ahead, avoiding death by seconds.'

She's right,' said one, squinting at her. 'It's no use.'

'Shut up, Goldberg,' Gomm snapped. 'She's got a gun, hasn't she?'

'*One*,' said the white-haired individual. 'This must be Mottershead.' 'One gun against all of them.'

'I'm going back to bed,' Goldberg said.

'This is a chance to escape,' Gomm said. 'Probably the only one we'll ever get.'

'He's right,' the woman said.

'And what about the games?' Goldberg reminded them.

'Forget the games,' Floyd told the other. 'Let them stew awhile.'

'It's too late,' said Vanessa. 'They're coming.' There were shouts from both ends of the corridor. 'We're trapped.'

'Good,' said Gomm.

'You are insane,' she told him plainly.

'You can still shoot us.' He was grinning.

Floyd grunted. 'I don't want to get out of here *that* much,' he said.

'*Threaten* it,' Gomm said. 'Tell them if they try anything you'll shoot us all.'

Irenya smiled. She had left her teeth in her bedroom. 'You're not just a pretty face,' she said to Gomm.

'He's right,' said Floyd, beaming now. 'They wouldn't dare risk us. They'll have to let us go.'

'You're out of your minds,' Goldberg muttered. 'There's nothing out there for us.' He returned to his room and slammed the door. Even as he did so, the corridor was blocked off at either end by a mass of guards. Gomm took hold of Vanessa's rifle and raised it to point at his heart.

'Be gentle,' he said, and threw her a kiss.

'Put down the weapon, Mrs Jaspe,' said a familiar voice. Mr Klein had appeared among the throng of guards. 'Take it from me. You are completely surrounded.'

'Kill them all,' Vanessa said, a little hesitantly. Then again, this time with more feeling: 'I'm warning you, I'm desperate. I'll kill them *all* before you shoot me.'

'I see,' said Klein quietly. 'And why do you assume I give a damn whether you kill them or not? They're insane. I told you that: lunatics, killers.'

'We both know that isn't true,' said Vanessa, gaining confidence from the anxiety on Klein's face. 'I want the front gates opened and the key in the ignition of my car. If you try anything stupid, we'll systematically shoot these hostages. Now dismiss your bullyboys and do as I say.'

Mr Klein hesitated, then signaled a general withdrawal.

Gomm's eyes glittered. 'Nicely done,' he whispered.

'Why don't you lead the way?' Vanessa suggested. Gomm did as he was instructed, and her small party snaked their way out past the massed clocks and telephones and video screens. Every step they took, Vanessa expected a bullet to find her, but Mr Klein was clearly too concerned for the ancients to risk calling her bluff. They reached the open air without incident.

The guards were in evidence outside, though attempting to stay out of sight. Vanessa kept the rifle trained on the four captives as they headed through the yards to where her car was parked.

'Gomm,' she whispered. 'Open the car doors.'

Gomm did so. He had said that age shrank them all, and perhaps it was true, but there were five of them to fit into the small vehicle, and it was tightly packed. Vanessa was the last to get in. As she ducked to slide into the driving seat, a shot rang out, and she felt a blow to her shoulder. She dropped the rifle.

'Leave her,' somebody piped up in the back, but Gomm was already out of the car and bundling her into the back beside Floyd. He then slid into the driving seat himself and started the engine.

'Can you drive?' Irenya demanded.

'Of course I can bloody drive!' he retorted, and the car jerked forward through the gates, the gears grating.

Vanessa had never been shot before, and hoped, if she survived this episode, to avoid its happening again. The wound in her shoulder was bleeding badly. Floyd did his best to stanch the wound, but Gomm's

driving made any real y constructive he p pract ca ly impossible

"There's a track—" she managed to tell him "off that way '

"Which way s that way? Gomm yelled

"Right! Right!' she yelled back

Gomm took both hands off the wheel and looked at them

"Which is right?"

'For Christ's sake '

Ireniya in the seat beside h m, pressed his hands back onto the wheel The car performed a tarantella Vanessa groaned with every bump

I see it!' said Gomm I see the track He revved the car up his foot s ammed down on the accelerator

One of the back doors which had been inadequately secured, flipped open, and Vanessa almost fell out Mottershead reaching over Floyd, yanked her back to safety; but before they cou d close the door, it met the boulder that marked the convergence of the two tracks The car bucked as the door was torn off its h nges

We needed more air in here," sa d Gomm and drove on

Theirs was not the on y engine disturb ing the Aegean night There were l ghts behind them and the sound of hect c pursuit With Gu lemot's rifle left in the convent they had no sudden death to barga n with and Kle n knew it

'Step on it' Floyd said grinning from ear to ear "They're coming after us '

'I m going as fast as I can,' Gomm insisted

'Turn off the lights,' Ireniya suggested It ll make us less of a target "

'Then I won't be able to see the track, Gomm complained over the eng ne roar

"So? You re not driving on t anyhow '

Mottershead laughed and so—aga nst her better nstincts—d d Vanessa Maybe the loss of blood was mak ng her rresponsible but she couldn t help herself Four Methuselahs and herse f n a three door car driving around in the dark Only a madman wou d have taken th s seriously And there was the f nal and incontestab e proof that these people weren't the lunatics K ein had marked them as, for they saw the humor in it too Gomm had even taken to singing as he drove snatches of Verdi and a fa setto rendering of Over the Ra nbow

And if as her dizzied m nd had concluded these were creatures as sane as herself then what of the ta e that Gomm had to d? Was that true too? Was it possible that Armageddon had been kept at bay by these few g ggling geriatrics?

They re gain ng on us' Floyd said He was on his knees on the backseat peering out of the w ndow

We re not go ng to make it," Mottershead observed, his laughter barely abat ng 'We're a going to d e '

'There!' Ireniya yelled 'There's another track Try that! Try that!"

Gomm swung the wheel, and the car al most tipped over as t swung off the ma n track and followed th s new route With the lights extinguished t was impossible to see more than a glimmer of the road ahead but Gomm's style was not about to be cramped by such minor cons derations He revved the car unt the engine la y screeched Dust was f ung up and through the gap where the door had been a goal fed avoiding death by seconds

'Where are we go ng? Vanessa yelled Haven t a c ue, Gomm returned

Wherever they were head ng they were go ng at a fair speed Th s track was flatter than the one they'd left and Gomm was tak ng ful advantage of the fact Again he d taken to sing ng

Mottershead was leaning out of the w n dow on the far side of the car h s hair stream ng, watching for their pursuers

"We're los ng them!' he howled triumphantly 'We re os ng them!

A common exh laration se zed all the travelers now and they began to sing along w th H G They were sing ng so loudly that Gomm cou dn't hear Mottershead nform h m that the road ahead seemed to disappear ndeed, H G was not aware that he had dr ven the car over the c ff unt l the vehicle took a nosedive and the sea came up to meet them

'Mrs Jape? Mrs Jape?'

Vanessa woke unw l ngly Her head hurt her arm hurt There had been some terr ble times recently though it took her a while to remember the substance of them Then the memories came back The car p tch ng over the cliff the cold sea rush ng in through the open door the frant c cries around her as the veh c e sank She had struggled free only ha f conscious vaguely aware that Floyd was f oating up beside her She had said h s name, but he had not answered She said t aga n now

"Dead' said Mr K e n They're al dead "

'Oh my God ' she murmured She was looking not at his face but at a chocolate sta n on h s wa stcoat

'Never m nd them now ' he insisted Never m nd?

'There's more mportant business, Mrs Jape You must get up and qu ck y

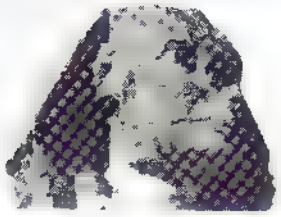
The urgency n Klein s voice brought Vanessa to her feet ' s l morning?' she sa d There were no windows n the room they occup ed This was the Boudoir to judge by ts concrete wa ls

Yes it s morning Kle n repl ed mpa tiently "Now will you come w th me? I have something to show you He opened the door, and they stepped out into the grim corr dor A little way ahead t sounded as if a ma or argument was go ng on raised voices mprecat ons and plead ngs

'What s happening?

'They're warm ng up for the Apoca lypse he replied and led the way nto the room where Vanessa had last seen the mud wrestlers Now a the video screens were buzz ng and each displayed a d fferent n terior war rooms and pres dential suites cab net off ces ha s of congress n every one of them somebody was shouting

IT MAY BE NEWS TO YOU



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You've been unconscious two full days." Klein told her as if this went some way to explaining the cacophony. Her head ached. She looked from screen to screen, from Washington to Hamburg to Sydney to Rio de Janeiro. Everywhere around the globe the mighty were waiting for news. But the oracles were dead.

They're just performers." Klein said, gesturing at the shouting screens. "They couldn't run a three-legged race, never mind the world. They're getting hysterical, and their button fingers are starting to itch."

What am I supposed to do about it?" Vanessa returned. This tour of Babel depressed her. "I'm no strategist."

Neither were Gomm and the others. They might have been, once upon a time, but things soon fell apart.

Systems decay," she said.

"Isn't *that* the truth. By the time I came here, half the committee was already dead. And the rest had lost all interest."

"But they still provided judgments?"

"Oh, yes."

They ruled the world?"

"After a fashion," Klein replied.

Klein looked at the screen. His eyes seemed to be on the verge of spilling tears.

"Didn't he explain? They played *games*, Mrs. Jape. When they became bored with sweet reason and the sound of their own voices, they took to flipping coins."

No."

And racing frogs, of course. That was always a favorite."

But the governments," she protested, "surely they didn't just accept—"

"You think they care?" Klein said. "As long as they're in the public eye, what does it matter to them what verbiage they're spouting, or how it was arrived at?"

Her head spun. "A *chance*?" she said.

"Why not? It has a very respectable tradition. Nations have fallen on decisions divined from the entrails of sheep."

"It's preposterous."

"I agree. But I ask you, in all honesty, is it any more terrifying than leaving the power in *their* hands?" He pointed to the rows of irate faces. Democrats sweating that the morrow would find them without causes to espouse or applause to win, despots in terror that without instruction their cruelties would lose favor and be overturned. One premier seemed to have suffered a bronchial attack and was being supported by two of his aides; another clutched a revolver and was pointing it at the screen, demanding satisfaction. Were these the finest fruit of the political tree—babbling, bullying, cajoling idiots, driven to apoplexy because nobody would tell them which way to jump? There wasn't a man or woman among them Vanessa would have trusted to guide her across the road.

Better frogs," she murmured, bitter thought that it was.

The light in the courtyard, after the dead illumination of the bunker, was dazzlingly bright, but Vanessa was pleased to be out of earshot of the stridency within. They would find a new committee very soon, Klein had told her. It would be a matter of weeks only before equilibrium was restored. In the meanwhile the earth could be blown to smithereens by the desperate creatures she had just seen. They needed *judgments* and quickly.

"Goldberg is still alive," Klein said. "And he will go on with the games, but it takes two to play."

"Why not you?"

Because he hates me. Hates all of us. He says that he'll only play with you."

Goldberg was sitting under the laurel trees playing patience. It was a slow business. His shortsightedness required him to bring each card to within three inches of his nose to read it, and by the time he had got to the end of the line he had forgotten those cards at the beginning.

She's agreed," said Klein. Goldberg didn't look up. "I said *She's agreed*."

"I'm blind, not deaf." Goldberg told Klein, still perusing the cards. When he eventually looked up it was to squint at Vanessa. "I told them it would end badly," he said softly, and Vanessa knew that beneath this show of fatalism he felt the loss of his companions acutely. "I said from the beginning we were here to stay. No use to escape." He shrugged and returned to the cards. "What's to escape *to*? The world's changed, I know. We changed it."

"It wasn't so bad," Vanessa said.

The world?"

"The way they died."

"Ah."

We were enjoying ourselves, until the last minute."

Gomm was such a sentimentalist," he said. "We never much liked each other."

A large frog jumped into Vanessa's path. The movement caught Goldberg's eye.

Who is it?" he said.

The creature regarded Vanessa's foot balefully. "Just a frog," she replied.

What does it look like?"

"It's fat, with three dots on its back."

"That's Israel. Don't tread on him."

Could we have some decisions by noon?" Klein butted in. "Particularly the Gulf situation, and the Mexican dispute—"

Yes, yes," said Goldberg. "Go away."

"We could have another Bay of Pigs."

"You're telling me nothing I don't know. Go. You're disturbing the nations." He peered at Vanessa. "Well, are you going to sit down or not?"

She sat.

"I'll leave you to it," Klein said, and retreated.

Goldberg had begun to make a sound in his throat. *kek-kek kek*—imitating a frog. In response, there came a croaking from every corner of the courtyard. Vanessa stifled a smile. Farce, she had told herself once before, had to be played with a straight face, as though you believed every outrageous word. Only tragedy demanded laughter, and that with the aid of the frogs, they might yet prevent. ∞

BOOKS

CONTINUED FROM PAGE 24

Research eventually led her to a beehive-like stone building known as Arthur's O'on (Oven). Located in Stirlingshire, it was just south of Stirling Castle. "It was a round domed temple used, like those in Jerusalem, to shelter and display a tomb and holy relics," Goodrich says. "The so-called Round Table was in fact a temple."

I'm always debunking things demanding evidence," contends Goodrich. "But when we'd find these places, I'd have feelings that went beyond any evidence. And in the end it was like puzzle pieces falling into place." Take, for example, her first sighting of Avalon and the Grail Castle. "There are houses on either side of the narrow, winding road—King's Vale Royal on the Isle of Man in the Irish Sea." The road suddenly drops to the ocean level and you spot a gloriously golden beach beyond which is inky opaque, blue sapphire water," she says. "Offshore St. Patrick's Isle lies surrounded by black rocks and covered with grassy mounds and vibrant sea thrift flowers. A rosy light reflects off the remnants of an old stone tower. The scene fits *Sone de Nansai*'s description." "I gasped when I saw it, overcome by a feeling of holiness," she recalls. "It was overwhelmingly beautiful and the most awe-inspiring place I had ever seen."

Not all Arthurian scholars however are convinced by Goodrich's evidence. Geoffrey Ashe, a prominent British Arthurian expert, claims Goodrich has created a pseudohistory. "She never offers any plain historical testimony clearly free of legend," he says. "She never produces even a reference to Arthur that can be proved to be earlier than the ninth century."

Yet discoveries on St. Patrick's Isle at least seem to parallel Goodrich's hypothesis and far surpass archaeologists' expectations. University of Liverpool's David Freke, director of the excavation, describes their find as a Christian–pagan sandwich. On one level they found a Christian cemetery, beneath it a Viking burial ground. Still deeper is an earlier Christian site dating from the fifth or sixth centuries, the era of Camelot. But Freke told a local newspaper this does not yet prove or disprove Goodrich's claims.

More will be learned as Freke and his associates continue their investigation. Evidence of floodwaters with sand deposits in the ancient site, Goodrich suggests, might coincide with accounts of Avalon. They might also find Guinevere's remains, buried with her son's head clutched against her bosom, a possibility that excites the archaeologists. Even if their findings give greater credence to her work, though, Goodrich doesn't expect it to quiet her critics. "No matter how much is proved, it's a matter of faith," she says. "And like religious faith, you can't debate it and win. You either believe or you don't." ∞

STAR TECH

ACCESSING THE FUTURE

3-D TV

Scientists at the University of Leeds in England have finally designed a viewing system that presents images on computer monitors and TV sets in lifelike 3-D.

For its developers—Leeds biophysicist Sandy Geddes and his student Mark Harris, now at the University of North Carolina at Chapel Hill—the original challenge was purely scientific: how to produce a coherent image of huge macromolecules whose thousands of atoms render them an incomprehensible blur when represented in two dimensions. They solved the problem by using frame-sequential stereoscopy, in which images are displayed alternately on the screen synchronized by a complex monitoring system, then "decoded" by a set of liquid-crystal spectacles worn by the viewer.

So far the system—which retails for about $3,000—has been sold primarily to pharmaceutical companies for use in drug design and to university research departments. Although the picture flickers under some conditions, marketer Steve Ralph is confident that once TV stations start broadcasting in 3-D, the Leeds system will quickly find its way into people's living rooms. "Technically," he says, "it's all available. Anyone who buys one of these viewers is ready to receive 3-D television broadcasts."—Bill Lawren

Access: Contact Millennium, Ltd., Boulton Road, Stephenage, Hertfordshire, England S61 4QX

LIQUID GOLD

In response to the growing drug-testing phenomenon in both government and private industry, a whimsical Austin, Texas, entrepreneur with a flair for irreverent promotion has begun selling vials of powdered—guaranteed drug-free—urine in a business where the sky would seem to be the limit.

Jeffrey Nightbyrd, owner of Byrd Laboratories, originally sold his product in liquid form, switching to powder as soon as the manufacturing process was perfected late last year. A freeze-dried version never panned out.

"All you do is add water, preferably distilled water," says the Texan, who admits that attaining a temperature close enough to the normal 98.6°F is still a bit of a problem. The company slogan is "Pee for Pleasure, Not for Employment," and the lab is described as "Purveyors of Fine Urine Products." Yellow gowns were de rigueur last winter at the first Urine Ball to raise money for the Urine Defense Fund.

Nightbyrd, who says he is not interested in whether his customers use his instant urine to beat job-application tests or for experimental purposes, has run into no legal problems so far. "We're violating no law," he insists. "We're just a chemical supplier."—George Nobbe

Access: Byrd Laboratories, 507 Trinity, Austin, TX 78701. The company charges $19.95 for enough powder to get you through two tests, and for another $5 you can get a booklet called *Success in Urine Testing*.

SURGICAL VACATIONS

You left your heart in San Francisco. Now you can leave your face in Geneva.

Because of soaring surgery costs in the United States, a West German company called Meditrans offers "surgical vacations" for people who want to save money on face-lifts, hip replacements, and radical new treatments for cancer—and see the world at the same time.

Former company spokesman John Christensen says the total cost of flying to Europe, staying in a hotel for a week, and having surgery is considerably less than the cost of surgery alone in the United States.

Say you want a face-lift. "We will fly patients first class to Switzerland or Germany," says Christensen, "provide transportation to and from the airport, put you up in a hotel for a week, and throw in a continental breakfast when you arrive." All for a mere $5,500.

Compare that with the average price for a complete face-lift in America—$8,500—and you've still got pocket change for a little postoperative shopping.—Michael Dale

Access: Don't pack your bags yet. Meditrans is still negotiating with U.S. air carriers, which are concerned about liability for botched surgeries and whether or not insurance companies will go along with such a plan. For more information, contact Wolfgang Bösl, Meditrans, Naumburgerstrasse 42, 8000 Munich 50, West Germany.

STARTECH

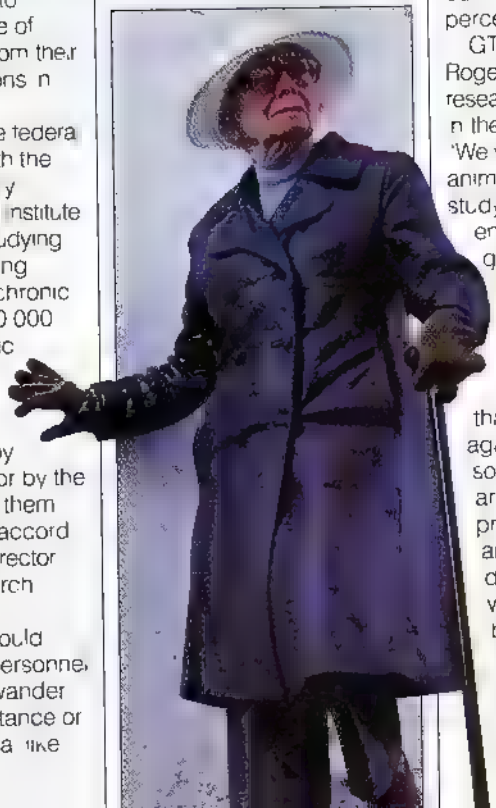
TRANSMITTERS FOR THE ELDERLY

Astronaut-tracking technology used during spacewalks will soon be adapted to track the elderly, some of whom wander away from their homes or the institutions in which they live.

At the request of five federal agencies involved with the problems of the elderly, the Research Triangle Institute in North Carolina is studying the efficacy of attaching small transmitters to chronic wanderers. Some 750,000 Americans are chronic wanderers. Many of these people are victims of memory impairment caused by Alzheimer's disease or by the medications some of them are required to take, according to Doris Rouse, director of the Triangle Research Institute team.

The transmitters would alert nursing home personnel when their charges wander beyond a certain distance or into a dangerous area, like a stairway. "There's a tremendous need for this," says Rouse. George Nobbe

Access: Early 1989, at a projected cost of about $250.



HIGH-TECH RACEHORSE INVESTING

Want to invest in a racehorse? Now you can increase your odds of picking a winner by studying six generations of the animal's ancestors and relatives, around 9,000 horses, thanks to a computerized data bank and evaluation system recently created by Tulsa-based Genetic Technology Inc. (GTI).

"GTI's formula looks at trends to see what genes are being pooled for speed, endurance, whatever makes a horse successful," says University of Tulsa cell biologist Stelfen Rogers, who serves on GTI's advisory board. "It has a ninety-five percent accuracy rate."

GTI is joining forces with Rogers and other scientists to research another innovation in the horse industry: clones. "We want to clone identical animals and use them to study the effects of different environments versus genetics," biologist Rogers explains.

Although the technology is available to clone racehorses now, Rogers doesn't expect that clones will be racing against each other anytime soon. Horse breeders are afraid cloning will produce too many good animals and drive prices down. "Actually, we think it would improve the breed." Sherry Baker

Access: GTI's horse evaluation system is available for under $100 for a single horse. For more information, contact GTI, 4500 South Garnett, Suite 211, Tulsa, OK 74146, Phone: (918) 627-6322.

SHIPS WITH WINGS

The notion of hybrid vigor – improving something by crossbreeding it with something else – is just as valid in technology as it is in animal husbandry. A recent case in point is the Wingsail, an ingenious piece of hybridization that uses airplane hardware to enhance the performance of boats.

The brainchild of British engineer John Walker, the Wingsail is simplicity itself: a modified airplane wing and tail mounted vertically on the

mast of a ship (see above). The wings act much like sails, catching prevailing winds and converting them to forward thrust. Needing neither ropes nor rigging, the Wingsails are controlled by a set of computers, so virtually all a skipper has to do is tell the system to stop or go.

In operation since last summer aboard the British

freighter *M V Ashington*, the Wingsail has sped up the boat an average of two knots while cutting her fuel consumption by 20 percent. Her most grueling test came when she was caught in the Bay of Biscay by Hurricane Charlie. While one nearby ship sank and others slowed to a safe crawl, the Wingsail driven *Ashington* actually sped up from three knots to eight, passing everything in the water and cutting 12 hours off the Tunisia-to-Scotland run.

Walker now plans to adapt the Wingsail to the yacht market for about $175,000 (for a 42 foot trimaran). "It's a marvelous way to go sailing," Walker says, "because you don't have to have a crew of athletes onboard. All you need is your brain and your fingertips."—Bill Lawren

Access: Contact Walker Wingsail PLC, Hamble Lane, Hamble, Southampton England SO3 5JR.

JUMBO PRINTER

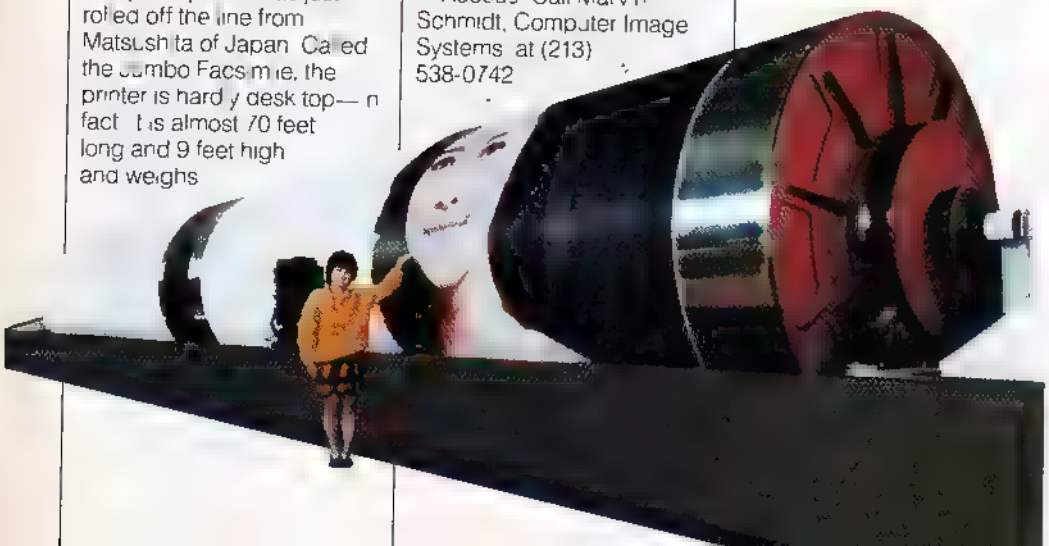
The world's biggest computer printer has just rolled off the line from Matsushita of Japan. Called the Jumbo Facsimile, the printer is hardly desk top—in fact, it's almost 70 feet long and 9 feet high and weighs in at a hefty 14 tons. More remarkable yet, it is capable of printing out whole billboards—four color sheets up to 50 feet wide—in a single stroke.

The Jumbo works by optically scanning the image and converting the elements into a digital code. The computer then displays the image on a color television screen so operators can play with the colors and shapes until they have the image just the way they want it, at which point they can instruct the computer to spray paint it onto a huge sheet of paper wrapped around the Jumbo's roller drum.

To make a printer this big, Matsushita had to sacrifice quite a bit in the way of speed. The Jumbo's fastest time for a single sheet is about one and one-half hours. But when you compare that with the average time for a conventional hand painted billboard—some two weeks—the Jumbo begins to look very quick indeed.

—Bill Lawren

Access: Call Marvin Schmidt, Computer Image Systems, at (213) 538-0742.



IBM'S SECRET . . . ON DISK

IBM has long been held up as one of the marvels of modern management. One of the reasons may be the Mobley Matrix, a system of financial planning developed by Lou Mobley, creator and former director of IBM's executive school. Long held secret by IBM, the Matrix is now being made available to the public by Mobley in the form of a computer software program.

Using the Matrix, executives can project cash needs to fund growth, present financial justification for obtaining bank loans or venture capital, and analyze the competition, by means of a technique IBM has employed for years. The Matrix calculates the impact of financial decisions in less than three seconds. Normally such pro forma analyses take several weeks to prepare.

According to Mobley, accountants produce fragmented information for company outsiders like bankers and investors, not for executives who need management information. The Matrix, on the other hand, produces information for insiders—especially chief executive officers—to help them gain control over strategic finance, which they typically find frustrating and mystifying.

—Dick Richards

Access: The $595 package runs on an IBM PC. Phone 1-800-772-1990.

GRAND ILLUSIONS

CONTINUED FROM PAGE 46

or a disappearing bearpet or floating across the Grand Canyon—you couldn't imagine these things being done twenty years ago because no one would want to spend a half million dollars on a production." With the thought of huge sums of money to spend in the future, Gardner has clearly had fun thinking of 'some crazy ideas' for magic in the twenty-first century.

Included in his heavily financed futuristic magic show are the following miracles: stopping the earth from rotating; walking across Lake Michigan; floating a hippopotamus across the English Channel; cutting and then restoring a cable on the Brooklyn Bridge; changing the color of the sky; raising the *Titanic*; turning the Washington Monument upside down; sawing Manhattan in half; parting the Red Sea; or making the moon disappear.

John Gaughan—probably the world's leading designer of custom illusions for magicians like Doug Henning, Copperfield, Blackstone, and Siegfried and Roy—is intrigued by the dichotomy between the past and future in the magic he is asked to create. Often in the same act, occasionally within the same effect, he will be called upon to combine high-tech futuristic elements with almost atavistic torture devices. Sawing a woman in half with a laser beam—an illusion he built for Copperfield some eight years ago—is a specific example. "In another effect a woman is strapped to a table, and Siegfried and Roy approach her, each holding a three foot square glass shield. Each shield is equipped with five spike shaped projections that fire ruby laser beams to vaporize various objects in their path. Eventually the woman is subjected to a double bed of nails as both spiked shields mesh apparently crushing her. Gaughan sees this peculiar trend continuing in the future.

According to James Randi, the Mac-Arthur award winning magician and investigator of claims of the paranormal, "In the year 2000 the very art of magic will have of necessity, to keep pace with the times. I think that if Harry Houdini, great artist that he was, were to reappear among us, he would have a very difficult time catching up with what is happening in the modern-day magic scene." Expense alone, Randi surmises, would prohibit the magicians overt use of new technologies. And he thinks it's unlikely that a magician can beat new technology to the market. "It's entirely possible," he says, "that someone will grasp some piece of technology and apply it in such a way that it's not evident it's being used *behind the scenes*."

An example of just such a device is the sophisticated hearing aid and transmitter Randi recently exposed in the faith-healing prayer meetings of the Reverend Peter Popoff. In a modern variation on the Talking Teakettle, Popoff's wife would relay the information to the reverend through his hearing aid, and Popoff would repeat it to the astounded participants. If such devices are used by magicians or mentalists of the future, instead of looking up their sleeves they might have to walk through an airport security X-ray machine or undergo the equivalent of a criminal strip search to assure their audience that no sophisticated transmitters were being employed.

Jim Steinmeyer, the remarkable young inventor of stage illusions and consultant to Doug Henning and other leading magicians, believes that presentation rather than technology is the key to magic in the future. "No contemporary magic technology is beyond people's understanding," he says, "but many of us do not understand how a Xerox machine or a bar-coded grocery product works. As children, we are fascinated by a leaf turning colors. It seems we are witnessing a miracle until we are told that when the leaf loses chlorophyll it changes colors and dies. We are taught not to be fascinated by such things." What magicians do, Steinmeyer says, is remind you that there is something in the world beyond your understanding. They give you insight into everyday things that you think you are familiar with but then realize you are not."

Conjurers use recurrent classical romantic, and often fairy tale themes because they appeal to our emotions. "Floating a lady is magical; levitating a robot is not," says Steinmeyer.

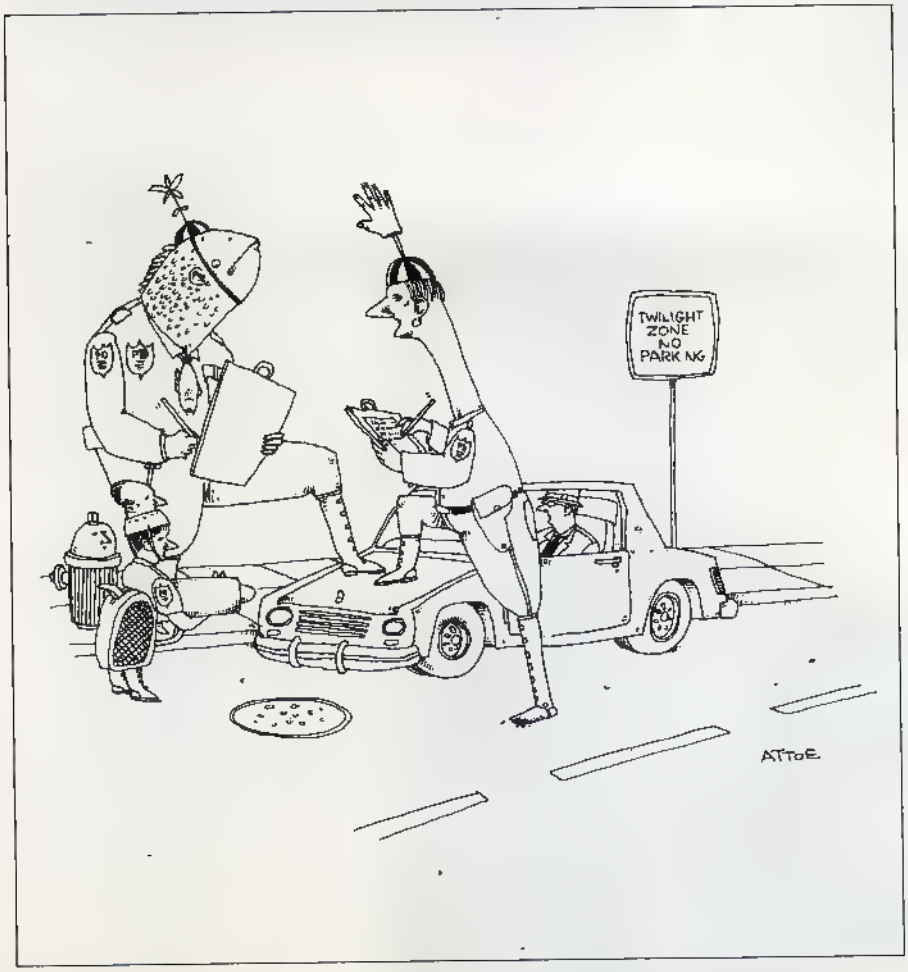
Penn and Teller, whose very successful New York theater show has poked fun at the conventional magician's craft, think today's sophisticated audiences will demand a new approach to magic in the future. So the duo performs effects with computers, copy machines, and TV sets.

"A television is a genuinely mysterious object," Teller says. "Consequently it's a good subject for magic." On both their PBS specials and a forthcoming home video entitled *Cruel Tricks for Dear Friends* (available this summer), they have specifically demanded an interaction between the normally passive at-home viewer and the television screen. In the video, Penn and Teller will teach people how to perform tricks for their friends using the VCR and the TV. Such interaction may provide an interesting new trend in conjuring in the years to come.

Siegfried and Roy, best known for their spectacular Las Vegas illusions with exotic animals, were among the first magicians to employ a high-tech look, including the use of laser tunnels and pyrotechnics.

Computers and videos, they feel, are shortening the attention spans of live audiences, so they use "scientific dressing" to move their production along at a brisk pace. "We use technology to enhance, not to dominate," says Roy.

"When I started in magic," says Siegfried, "people gave me five hundred rea-



sons not to perform people don't care about magic because of technology because people can fly to the moon The remarkable success of the duo has proved this untrue They believe that new scientific discoveries will enhance the thinking of the audience as well as of the magician As technology increases they warn magicians may become an endangered species Those who survive will have to rely on basics skill and personality They think that television and video are 'emotionless' and that 'when magicians perform with expertise and emotion the public will realize how special they are Then they will be given even more respect than they are now if we stimulate people's fantasies Siegfried says perhaps something great technologically may develop'

It may surprise readers that the most radical theories about the future of magic are held by the most well known contemporary star Doug Henning "The magic of today is the science of tomorrow" he says

According to Henning there are two distinct types of magic *illusionary magic*, which is a seemingly impossible occurrence caused by a law of nature that is understood and is common knowledge in the scientific world and *real magic* a seemingly impossible occurrence caused by a law of nature that science hasn't discovered yet Henning believes both illusionary and real magic exist in the world now and before the year 2000 he envisions conjurers performing real magic

In a view markedly different from that of the vast majority of magicians who based on their knowledge of deception are skeptical of paranormal effects Henning believes that telepathic communication or the ability of the mind to move inanimate objects will be possible in the near future

Science says that we use only ten percent of our brain he says "If we used more I believe that in the next five to ten years we could actually control matter and do psychokinesis and levitate the body onstage through real magic Performers [will be] doing things that Uri Geller claims he did for real using illusionary magic You're going to see [magicians] doing real magic"

Even the physical look of Henning's show would differ greatly from those of his contemporaries "Currently our senses are bombarded with high tech looks lights and sounds" Henning says He imagines a return to simpler more natural themes For instance in one sequence he imagines a celestial forest with shimmering trees as the background "An oversize flower with transparent petals would start to open and bloom" Henning says The flower would begin to glow as if there were a light from inside Eventually a woman would emerge wearing gossamer butterfly wings She would float out of the flower and around the stage suddenly vanishing in midair

If Henning is correct effects with holograms computer chips fiberoptics, and lasers will seem like child's play to magicians of the future

SPACE

CONTINUED FROM PAGE 20

composite materials would not

Because asteroids may be valuable sources of metals like nickel and iron and such elements as carbon and nitrogen the institute has funded studies on the feasibility of finding and retrieving those wandering planetary bodies that are captured by Earth's gravity Scientists are also planning to recycle the shuttle's massive external tanks usually discarded after each launch as components of space habitats

The Space Studies Institute is studying large-scale projects solar power satellites mammoth wings of silicon that would collect sunlight and beam it to receptors on Earth as microwaves and space manufacturing by remote control We won't need a permanent crew of people on the moon to operate the factories Supervisors on Earth could monitor whole fleets of lunar robots and direct their activities by television hookups Every now and then a skeleton crew of humans might shuttle up to make needed repairs and adjustments

The institute hosts a space-manufacturing conference every two years to discuss new ideas and to disseminate information (The next one will be held in Princeton from May 6 through May 9 For more information write to the Space Studies Institute at 285 Rosedale Road, Box 82 Princeton NJ 08540) Space science experts from around the world will descend on the town to suggest and discuss various agendas for commercializing space

At least one discussion will center on a low-cost lunar polar probe, an orbiter that would be sent over the top and bottom of the moon to find out whether there's water at the lunar poles Because water's two constituents hydrogen and oxygen are the primary ingredients of rocket fuel, such a discovery would be like finding a new oil field on Earth

The institute and the biannual conferences are the result of Gerard K O'Neill's reaction to the frustrations of doing research work for NASA "Every year some new party line would come down from headquarters, and I was having to spend far too much of my time thinking up new ways to justify the same research program over and over again," he recalls So in 1977 he decided to take his case to the people to get their support directly Today the institute has some 4 000 dues-paying members many of them skilled researchers in space sciences

Not everyone supports the institute's goals which have sometimes been criticized as unrealistic, too expensive or even dangerous Jesco von Puttkamer NASA's manager of long range planning has said O'Neill's goal of orbiting space colonies would cost at least $220 billion making it financially impossible To attempt such a thing he says would bankrupt the space program And in a Worldwatch Institute report researcher Daniel Deudney found the romantic ideal of large space colonies oversold Life in space for the foreseeable future will be like that in a submarine on an offshore oil platform or in an Antarctic mining camp dangerous cramped isolated and uneventful he said He criticized the idea of building a huge solar power station in Earth orbit as being environmentally risky since it would be beaming megawatts of electricity to Earth in the form of microwaves Deudney went so far as to characterize the solar power satellite as a shot in the dark experiment with the earth's atmosphere

You may wonder if SSI members are perhaps throwing their hard-earned money at some pie-in-the sky fantasy But consider O'Neill's other recent venture Geostar a satellite based navigation and communications system O'Neill patented the basic apparatus in 1982 and formed a corporation to market it in 1983 selling the founding stock to friends and associates for a penny a share On March 28 1986 the first space-based component of the system was placed in orbit by an Ariane rocket By the end of the year, shares of the stock were $32 each a down-to-earth achievement for a wild eyed dreamer

O'Neill has dreamed of building orbiting space colonies and has written and lectured extensively on the subject But he is enough of a realist to know that before you get colonists you have to provide people with an incentive to leave Earth He is convinced that one small successful enterprise will launch the human migration out into the solar system "When that first breakout occurs" he says "the others will follow inevitably Then there's just no stopping it Once it begins, then the diaspora of human civilization is bound to go on and out as it always has done in the process of settling new frontiers

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Editors' note Anyone wishing for more information about SSI and other space advocacy groups might be interested in a book on the pro space movement Reaching for the High Frontier *by Michael A G Michaud It is available from Praeger Publishers c o Greenwood Press 88 Post Road West Box 5007 Westport CT 06881 Price $17 95*

CREDITS

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An ancient shell game:
balancing eggs to celebrate the spring

GAMES

By Scot Morris

What are you doing on March 20, at 10:52 PM EST? We'll be trying to balance eggs on their ends, and so will Donna Henes, who will also celebrate her twelfth annual observance of the vernal equinox—the moment when the sun crosses the equator and ushers in spring for the Northern Hemisphere. At that precise moment, day and night are of equal length all over the earth. Then and only then, the legend goes, you can balance an egg on its fat end.

"I don't know why it works," Henes told us, "but it does. Maybe it's because for a time surrounding the exact moment of the equinox, the sun is directly over the equator, and the earth is balanced within the universe."

It's a phenomenon that has both delighted and mystified people since antiquity. Someone in China discovered it thousands of years ago. According to an ancient Chinese book, *Know What Heaven Knows*, on the day called Li Chun ("spring begins"), winter ends. And for a few minutes just before and just after the seasons change, eggs will stand on end.

In 1945 a report appeared in *Life* about how everyone in Chungking, China, was relieving the tensions of war by trying to balance eggs on the first day of spring. Walter Rundle of the United Press decided to try it for himself. The skeptical journalist was amazed to discover that he was able to stand several eggs, and he wrote a story about the event.

The news got back to China the next day that Albert Einstein, after reading Rundle's story, had been dubious, calling egg balancing "a Chinese trick." Because the legend holds that eggs will stand for only two hours each year, however, there seemed to be little to do about it.

The controversy heightened as some Americans claimed that it was an old magic trick: Shake an egg until the yolk breaks and it will stand on end. Or you could do it the way Christopher Columbus supposedly did it, by cracking the bottom of the shell slightly. But Rundle was offended by the suggestion that someone had pulled a trick on him, and the local Chinese press—resentful of Einstein's slight—launched an attack on the hard-boiled scientist.

At the next weekly press conference held in Chungking, Chinese authorities discussed postwar planning, currency stabilization, and the Communist problem, then moved out to the yard to stand up eggs. Several people, including Wong Wen Hao, head of the Chinese War Production Board and minister of economic affairs, were successful. The plan had been to spell out the phrase NUTS TO EINSTEIN in eggs. The *Life* correspondent reported, however, that "there were some who thought this undignified." The demonstration was canceled.

This event did not take place during the equinox, so by balancing eggs at all, these Chinese officials were demonstrating an inconsistency in the lore. Even so, the legend continues to have a strong appeal.

Most likely, time of the year has nothing to do with it. Indeed, we expect that you can balance eggs on any day. But mindful of the legend, you try harder when you do it on the first moment of spring. You are more patient,

perhaps more in tune with your muscles, and able to make the fine adjustments necessary to find the balancing point. Yet we have tried it and successfully balanced eggs on glass in December.

We called James Randi, the magician and arch-skeptic, for his opinion. "It doesn't seem to occur to people to try it on other days," Randi says. "The fact is, you can balance an egg today or a week from next Tuesday. All it depends on are the qualifications of the egg, the nature of the surface, and perhaps the sobriety of the balancer."

Games expert and science journalist Martin Gardner adds that the surface of the egg itself is critical. If you sandpaper the bottom of an egg to eliminate all the small bumps, for instance, you can try forever and never balance the egg on a Formica surface. So doctoring an egg can certainly affect its ability to stand.

On the other hand, David Eisendrath, a contributing editor at *Modern Photography* who is a consultant in scientific and technical photography, is a believer. "I'm under the impression that it does work better just before or after the equinox," he says. "For many years my wife has balanced a dozen or more eggs on our front porch. She has also done them on a plate and on a sheet of glass. I have no valid excuse or serious explanation for it: day–night cycles, sun pull, moon pull, tides, I don't know. If I tried today, I could stand maybe one or two eggs. But on the first day of spring I might be able to do two dozen."

A local expert, Dr. Wang, a graduate of the Munich Technological Institute, offered his own theory back in 1945: Egg balancing was all a matter of cold weather and liquidity. In the cold, an egg contracts and lowers its center of gravity, he explained. He predicted that on the hottest summer day, an egg would stand if first chilled in a refrigerator. "This particular experiment," he noted, "will have to be done in America, where there are refrigerators."

Well, the experiment has been conducted. "I first thought I would have to use organic eggs at room temperature," Donna Henes says. "But that's not the case at all. I've had friends tell me that you can use any eggs, even ones that have come right out of the fridge. They don't even have to be room temperature."

For the last 11 years Henes has been celebrating the vernal equinox by balancing exactly 360 eggs—the symbolic division of the circle. In 1984 the critical moment occurred during the lunch hour, and Henes gathered her biggest crowd ever—about 5,000 people—at the plaza of the World Trade Center in Manhattan.

Henes describes herself as an "artist and ritual maker" committed to international harmony. In 1983 she held her ceremony at Ralph Bunche Park, across the street from the United Nations (this page, top left). A reporter who covered the event for *The New Yorker* (April 4, 1983) was able to balance an egg in about 15 seconds. Fascinated, he went back to the same place a week later to see if he could do it again. He tried for 20 minutes before giving up. He might have tried again in six months because the balancing feat also works, Henes says, on the fall equinox (September 21).

But spring is when Henes chooses to celebrate the event, which she calls Eggs on End: Standing on Ceremony. (Several of these demonstrations are shown atop these pages.) Springtime seems an appropriate choice: The egg is a symbol of fertility and rebirth. Indeed, celebration of the first day of spring dates back to the pagan worship of Eastre, goddess of spring. "The events and rituals I create are sort of like silly science lessons or nondirected play—certainly more 'kindergard' than avant-garde," she says.

Well, we plan to try it March 20, at 10:52 P.M. EST, just as the sun crosses the equator. In Los Angeles it will occur at 7:52. We invite our readers to participate in this shell game as well.

We will also try it on Li Chun—February 4—the first day of spring according to the Chinese calendar. This is the one little problem with the ancient tradition—for all these years eggs have been balancing in China about a month and a half *before* the vernal equinox. But we'll put that discrepancy out of our minds as we contemplate the unity of the universe and try to balance our eggs on March 20.

COMING IN APRIL

An *Omni* experience: Learn how to control your dreams. Build a paper version of *Voyager*, the superlight aircraft that circled the globe on just one tank of gas. In a special insert—16 pages packed with hands-on experiments for the adventurous reader—*Omni* will tell you where to get a color map of your brain and where to find a computer system that will let you create drawings of music you compose yourself. You'll also get to exercise your powers of detection in a genuine Turing test: Were the lines "To drown to be slow hair/ To be fish minstrelry" written by a computer or a human? Only *Omni* knows for sure, but so can you when you pick up the April issue and read "The Omni Experience," a magazine within a magazine. ∞

J&B PRESENTS THE TELEPHONE CRYPT II

ADVERTISEMENT

Code. The very word is intriguing. It conjures up mystery, concealment. It speaks in a language known only to the sender and to those rare individuals privy to the secret.

To make the meaning perfectly clear, the translation unambiguous, usually each letter is represented by one specific symbol in decoding. The 26 letters in the alphabet translate to 26 different letters in the code. But it is possible to use far fewer symbols in the code and still get the meaning across in context.

In the code below, the message was spelled out on a telephone dial, with each number standing for one of three letters:

2 = ABC	6 = MNO
3 = DEF	7 = PRS
4 = GHI	8 = TUV
5 = JKL	9 = WXY

For our purposes we'll use the numeral "1" to indicate punctuation marks and "0" for spaces between words. Now, the message has some built-in ambiguity. The number "8" could stand for a *T*, a *U*, or a *V*. The "4" could be a *G*, an *H*, or an *I*.

Does that ambiguity make the message indecipherable? Not at all. Because of the regularity (predictability) of English in context, there is only one solution.

1242722837047066730

327459053780

842607326837331 10

18466270724630

4373170860

727302427228371

Look for the solution to this puzzle next month in *Omni*.

LAST WORD

By William C. Mericle

Mental hospitals all over the country are filling up because of Dr. Fritz Smudge. He revolutionized psychiatry by discovering that there are definite answers to the Rorschach test.

This afternoon alone, 852 people will be declared legally insane. That's just in Toledo. Across the country, homes, offices, and factories are emptying and mental hospitals are filling up, all because of one man: Dr. Fritz Smudge. Smudge has revolutionized psychiatry by discovering there *are* definite answers to the Rorschach test—the projective personality test pioneered in 1922 by the eminent Dr. Hermann Rorschach.

Most commonly known as the inkblot test, Rorschach's test asks a person to describe the images that come to mind when he views a series of strange, symmetrical ink patterns. Until recently, psychiatrists interpreted the patient's responses without any concern as to whether the series of inkblots had specific meanings.

Now, thanks to Smudge, they have definitive answers, all recorded in a set of handwritten notebooks by Rorschach called *The Inkblot Answer Book*. Smudge claims he happened upon the historic notebooks while on a skiing trip.

"They were cheap. I found them in a used bookstore in Switzerland," Smudge said, beaming. "And I was able to write off my vacation as a business expense!"

After realizing the importance of his find, he turned the weathered notebooks over to the experts at the American Rorschach Society (ARS). They were stunned by what was there. In addition to answers for the ten blots in common use, the notebooks contained 8,376 never-before-seen blots, plus detailed instructions on how to make new ones.

"It was incredible!" Smudge revealed. "They even told you how to fold the paper without getting ink on your hands."

After having spent eight and a half months deciphering Rorschach's poor handwriting, the ARS finally unveiled the New Improved Rorschach Test in Ohio last month. (It comes in two versions: one for patients; one for doctors, which has the answers in the back.)

"It appears we were all wrong," an ARS spokesdoctor commented. "Psychiatry *is* an exact science. Now a patient has to give us a definite answer. If he misses too many, we lock him up. It's kind of like quantitative analysis, only messier."

Already a majority of the world's psychiatric professionals rely on the 8,376 new patterns in their diagnostic workups, and mental hospitals are packed. Under the New Rorschach Test rules, a person has to correctly identify 85 percent of the blots to be declared sane. So far, that has proved difficult for most people.

The result? "Everyone's crazy!" crowed Smudge. "It's like Christmas!"

According to the notebooks, the reason Rorschach made his test so hard was to weed out "all those people who are talking about me behind my back."

While it is admittedly difficult, the New Rorschach Test has brought with it certain advances. Not only can psychiatrists make a more precise diagnosis, they can do it more quickly. A patient who used to require weeks of elaborate examinations and interviews can now be tested and locked up within an hour.

But Smudge and the ARS are still not satisfied. "It's not fast enough," Smudge said, sighing. "There are so many crazies out there and so few tests."

He thinks the answer to the problem lies in the last of the Rorschach notebooks, which is simply entitled *The Big Blot*. In it is Rorschach's master plan for "testing the masses." He envisioned having crowds of people viewing oversize inkblots on paper measuring eight-and-one-half by eleven kilometers. (One blot alone would require thousands of gallons of ink.) But ultimately Rorschach was forced to abandon his dream: "Not enough sane people to help me. . . ."

Smudge considered trying it himself, but the scale of the project was intimidating. "You'd need three thousand men just to fold the thing, and it would have taken a week for the ink to dry."

Inspired by Rorschach's vision, however, Smudge is busy working on his own version of the megablots.

"We'll put them up along highways and in malls, like billboards, and send out direct-mail questionnaires to everyone in the vicinity," he said. "It will be a closed-book test."

When asked how he would prevent someone from looking up the answers and cheating, Smudge answered, "Simple. We plan to use the honor system. In fact, we hope to make the honor system a federal law. Violation of the law would be punishable by death. No one would dare cheat."

Even without billboard blots, the long-term effects of Rorschach's notebooks are clear: As long as we have ink and paper, we'll have crazy people.

But just how did Hermann Rorschach hit upon the idea of using those funny blobs of ink? The answer was found in one of the rare notebooks.

It seems Rorschach was struggling to devise a true-or-false insanity quiz when he accidentally knocked over a bottle of ink. Noticing how the blot looked like a little bunny, he excitedly showed it to some friends.

"That is not a bunny," a girl challenged. "That is an elephant!"

"You're crazy!" Rorschach shouted. And the rest is history.

William C. Mericle is a freelance writer from Chicago who has been unjustly institutionalized for the past 15 years.